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VOLUME LXV FEBRUARY, 1955 NUMBER 2

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THE
LARYNGOSCOPE.

VOL. LXV FEBRUARY, 1955. NO. 2

SYMPOSIUM:

INTRACRANIAL COMPLICATIONS OF OTITIS MEDIA AND MASTOIDITIS IN THE ANTIBIOTIC ERA.

I. Modification of the Pathology of Otitic Intracranial Lesions by Antibiotic Preparations.*†

CYRIL B. COURVILLE, M.D., (by invitation),

Los Angeles, Calif.

Among the many great triumphs of medicine which have contributed to the conquest of disease, the use of antibiotic substances stands out pre-eminently. In no field of medicine has this achievement become so evident as it has in the intracranial suppurative diseases. This type of medication has become so effective as to threaten the very existence of those serious and very often fatal intracranial complications of otitis media and accessory nasal sinusitis.

The various lesions which constitute this group of infectious diseases, extradural and subdural abscess, venous sinus thrombosis, suppurative meningitis and abscess of the brain, were once commonly oberved at autopsy during the colder months of the year, even in the benign climate of Southern California; now they are very unusual and noteworthy.

To the present generation of younger physicians, all this is

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* Read at the meeting of the Western Section, American Laryngological, Rhinological and Otological Society, Inc., Los Angeles, Calif., January 16, 1955.

† From the Cajal Laboratory of Neuropathology, Los Angeles County Hospital, and the Section of Nervous Diseases (Neuropathology), College of Medical Evangelists, Los Angeles, California.

Editor's Note: This ms. received in The Laryngoscope Office and accepted for publication January 31, 1955.

accepted as a matter of fact. Only those who were once obliged to stand helpless by the side of patients who were dying of one or more of these complications after a long hard fight, are able to appreciate the miracle which has transpired within the past two decades. Even those of us who are in a position to compare the era so recently gone and the present one can profit by an analysis of the nature and extent of our triumph. Of greater importance, however, is a critical survey of what remains to be done and to consider measures which seem to be necessary to complete the task.

It is proposed, therefore, in this brief summary to make an up-to-date evaluation of the situation as it now exists with respect to the complications of otitis media and mastoiditis such as Dr. J. M. Nielsen and the writer did some 21 years ago. Attention will be drawn to the almost total elimination of thrombosis of the venous sinuses and of the dural infections, the stubborn persistence of meningitis and the reasons thereof, and finally the altered aspect of the problems of abscess of the brain as it appears today;* but before these details are investigated a comparison of the incidence of these complications over a five-year period before and after the introduction of antibiotic medications will be illuminating.

COMPARATIVE AUTOPSY STATISTICS IN THE PREANTIBIOTIC AND ANTIBIOTIC ERAS.

A study of the autopsy statistics of the incidence of otitic intracranial complications made in the period before the introduction of antibiotics disclosed some fundamental aspects of the problem (Courville and Nielsen, 1934). In an analysis of these lesions in fatal cases of otitic complications over a consecutive five-year period (July 1, 1928, to June 30, 1933), it was learned that approximately 25 of every 1,000 deaths in the Los Angeles County Hospital were due to some intracranial complication of otitis media (124 fatal cases in 5,227 autopsies in this period).

The incidence of these complications varied from year to

* Because this study is concerned primarily with our own experience in a single large hospital, references used in this study will be limited largely to those emanating from the professional services of the Los Angeles County Hospital.

year both in numbers and types of lesions. Meningitis, of course, was always the most common complication; thrombosis of the dural sinuses the next most common, and abscess of the brain usually the least common, although in one year this lesion was more often encountered than thrombosis. This fluctuation in the incidence of intracranial complications was not comparable, oddly enough, to the cases in which otitis media or mastoiditis was found at autopsy.

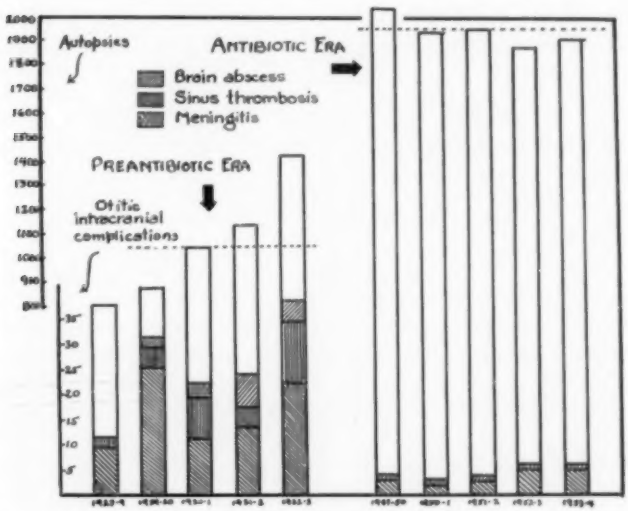

Fig. 1. Chart giving comparative necropsy incidence of otitic intracranial complications in preantibiotic (1928-1933) and antibiotic (1949-1954) eras.

To compare with these figures, the statistics of a second five-year period well within the antibiotic era were investigated (July 1, 1949, to June 30, 1954). In this period only 23 cases of fatal otitic intracranial complications were discovered in a series of 9,737 consecutive autopsies, approximately 25 in every 10,000 deaths in this hospital (see Fig. 1). This is about one-tenth of what it was 20 years ago. In other words, the drop in death rate from these complications has been approximately 90 per cent.

It is found that meningitis is still the most common complication. On the other hand, thrombosis of the dural sinuses has been practically eliminated. An occasional case of adjacent abscess of the brain, chiefly of the temporal lobe, was encountered during this period.

Only one example of "distant" otitic brain abscess, which, as has been pointed out, is secondary to an invasion of the lateral sinus and its communicating afferent veins, has been observed during this interval. In this case, a fulminating abscess of the right frontal lobe was associated with a bilateral frontal subdural abscess, also frequently secondary to venous extension.

The significance of this change will be discussed under the separate lesions, considered in more detail in subsequent paragraphs.

THE DURAL INFECTIONS.

In the old days the incidence of otitic dural lesions, both from a clinical and pathological viewpoint, was relatively high. It was true, of course, that these lesions *per se* were of relatively small clinical concern, for they were in themselves rarely fatal and infrequently demanded surgical attention. In most cases pachymeningitis externa and interna and their purulent counterparts, extra- and subdural abscess, represented only a stage in the process of direct layer-by-layer invasion of the intracranial space. The accumulations of fibrin or pus were small and added little if anything attributable to the manifestations of the toxic-septic state, nor did they betray their presence by any localizing symptoms or signs.

The presence of the rare, larger accumulation of pus within the subdural space (subdural abscess, empyema of the subdural space) after otitis media and mastoiditis was even then very difficult to establish because of the lack of well defined localizing phenomena, and because of the absence of outspoken signs of sepsis. Now it has become even more difficult after antibiotic substances have been administered, because of the reversal of leukocytic response in the blood and spinal fluid and the absence of fever.

The writer has seen but three such cases in the past decade. In one, a small child with chronic otitis media, inadequately and inappropriately treated with antibiotics, developed suggestive signs of a right cerebellar abscess. At operation this abscess proved to be a small one and was apparently adequately drained. The child failed to recover and remained quite ill, even though there was no rise of temperature and no leukocytosis. After a slow downhill course to death, an

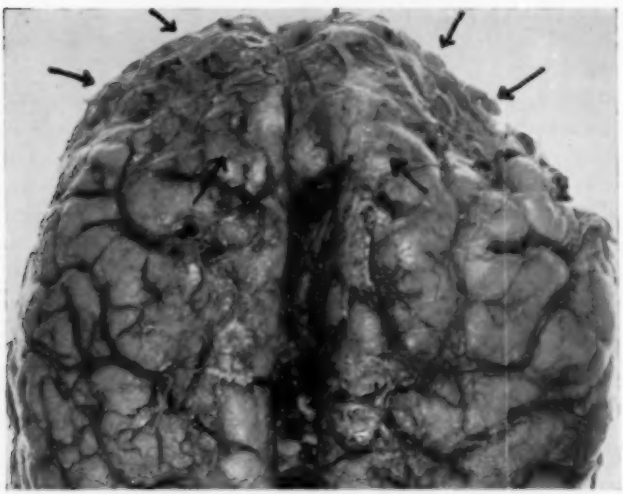

Fig. 2. Otitic subdural abscess (Aut. No. 45-911). The spread of exudate over both frontal lobes, as well as localization of a "distant" diffuse abscess within the right frontal lobe, suggests retrograde extension of infection by way of the venous system. See also Fig. 6 showing nature of underlying cerebral abscess.

extensive abscess was found to involve the entire subdural space of the right posterior fossa with extension into the left and above the tentorium below the right occipital lobe.

In the two other cases, both adults, which came to light in the present survey of fatal intracranial complications, the subdural abscess was associated with acute fulminating abscesses of the brain substance. In one the causative otitis

infection (left ear) was of life-long standing. Death came after an acute exacerbation, and at autopsy a subdural abscess was found in the left middle fossa and found to be associated with an acute abscess within the left temporal lobe.

In the second case, an exacerbation of a chronic right otitis media was followed by an acute fulminating abscess without effort at encapsulation of the right frontal lobe. A subdural abscess of considerable extent was found over both frontal lobes (see Fig. 2). The intracerebral lesion must have been due to venous spread, as indicated by its "distant" location, and the associated subdural abscess may well have been a coincident rather than a consecutive lesion from the same invasion.

In the light of the writer's experience with postmortem lesions of this type, they are bound to be of extremely rare occurrence and then usually associated with, and probably secondary to, abscesses within the brain substance. Their clinical diagnosis will be even more difficult, if not actually impossible. The lesson to be learned is that the clinician must continue to search for possible complications of this and other types so long as the patient does not fully recover.

VENOUS SINUS THROMBOSIS.

As in the case of other dural infections, thrombophlebitis of the dural venous sinuses and their afferent veins has been almost totally eradicated from the list of otitic infections of the intracranial space. This is due in no small degree to the prevention of acute mastoiditis, which was the most common cause of thrombosis of the lateral sinuses and their afferent vessels.

In the period of five years, from 1949 to 1954, not one example of thrombosis of the dural sinuses was found at autopsy. In one case of a young infant, thrombosis of the internal venous system of Galen associated with an otitis media was the obvious cause of death (see Fig. 3). The otitic infection may have been a contributing factor in what we have come to call the "mixed" (infectious and autochthonous) type of sinus thrombosis. It seems quite clear that the use of antibiotics in acute otitis, which has prevented the extension

of the infection into the mastoid, has thereby prevented the development of the consecutive involvement of the lateral (and less often the petrosal) sinuses.

In backward areas where medical attention is not immediately available, or ignorance and neglect prevents prompt antibiotic therapy, the infective type of dural sinus thrombo-

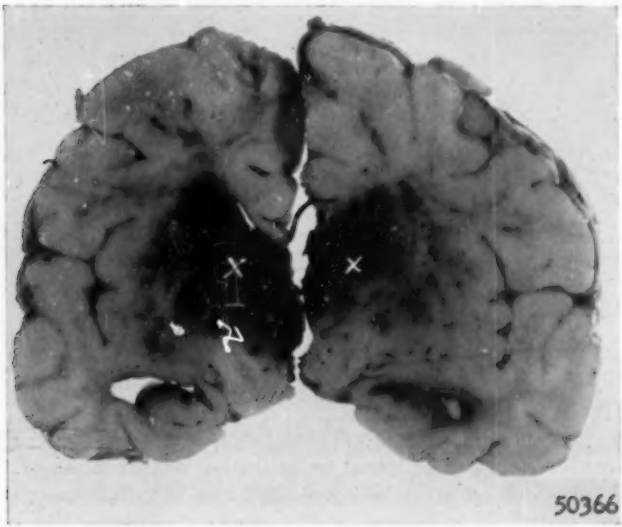

Fig. 3. Red softening of basal ganglia and surrounding cerebral centrum in an infant with otitis media (Aut. No. 50-366). This is a presumed case of a "combined" type of venous thrombosis of the internal venous system in which an infection (otitis media) and dehydration combine to result in thrombosis of the venous system.

sis may still be occasionally seen. In most communities, however, it is a lesion only with a past.

There still remains, however, the possibility of the "combined type" of thrombosis. In this situation both otitis media and dehydration combine their malign influences to provoke an occlusion of the lateral and/or superior longitudinal sinuses, less often also the internal cerebral system of veins. This situation might readily develop in feeble infants who

also have an otitis media due to an organism resistant to ordinary antibiotics. This, therefore, is a problem for the pediatrician who first sees these infants.

THE PERSISTENCE OF MENINGITIS.

The most dreaded of all intracranial complications of otitis media, septic or suppurative meningitis, continues to maintain its identity in spite of the various antibiotic agents. More than this, it has continued to claim its victims even from among those in whom these lesions seemed at first to be ameliorated by medication. It, therefore, behooves us to give more attention to this lesion during this recent period.

In the antibiotic era, the suppurative form of meningitis now constitutes by far the most common intracranial complication of otitis media. It was the cause of death in 18 of the 23 fatal cases studied at autopsy (78 per cent). This percentage is to be compared with that of the previous era, when meningitis occurred in 68 per cent of the fatal otitic intracranial complications (85 times in 124 cases). It is of interest to note that in two of the 18 cases, the meningococcus was the infecting organism, an interesting situation which also existed in the era before antibiotics were introduced.

What are the underlying factors which permit meningitis to survive as the most lethal complication of infections of the ear? First of all must be considered the very nature of the lesion, with the diffusion of the exudate through the subarachnoid space permitting not only its noxious effect on the functions of the brain as a whole, but also permitting the widespread absorption of the exo- and endotoxins of the invading organisms.

By the same token, the difficulty for any antibiotic agent to reach these organisms through the accumulation of heavy exudate in the subarachnoid space would also contribute to the failure of therapy in some cases. This is clearly seen in the process of recovery of meningitis after antibiotic therapy.

Recovery from Meningitis. A study of a series of partially healed cases of postotitic suppurative meningitis discloses some interesting facts. The action of antibiotic substances

seems to emanate from the blood vessels in the subarachnoid space and the pia mater. The first evidence of this action appears as exudate free areas and zones about these vessels. This is followed by a progressive widening of these zones until the exudate is broken up into isolated patches (see Fig. 4).

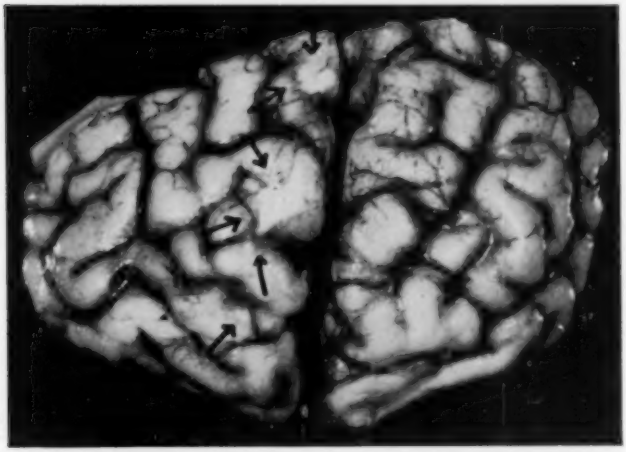

Fig. 4. Healing otitic meningitis (Aut. No. 39-017). Tips of the frontal lobes showing residual patches of exudate (arrows) after strenuous antibiotic therapy.

These patches are not only progressively reduced in size but also become less dense as time goes on. Finally, only faint regional clouding remains to show that an inflammatory reaction in the subdural space was once present. Then the meninges resume their normal appearance, in most cases without residual adhesion formation. Microscopic study reveals at this stage only scattered leukocytes. chiefly in the form of lymphocytes and large mononuclears.

In addition to these cases in which antibiotic therapy is imperfectly effective and in which death occurs in spite of even advanced degrees of dissolution of exudate, there still

remains a group in which such treatment is unavailing, due to the immunity of the infecting organism. In such cases in which death occurs after an acute course a thin exudate is found at autopsy, often with associated focal subarachnoid hemorrhages (see Fig. 5).

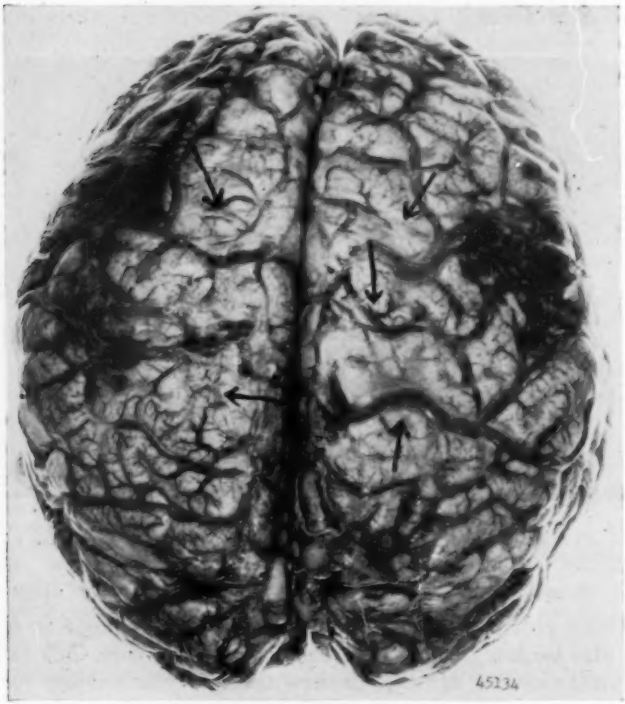

Fig. 5. Acute otitic meningitis in which infection did not yield to antibiotic therapy (Aut. No. 45-134). Milky clouding of the leptomeninges is associated with focal subarachnoid hemorrhage (acute stage of meningitis).

Mixed infections in which one or more of the invading bacteria are resistant to the antibiotic used, appear to be a factor in some cases. In still other instances, death is probably to be attributed to the low degree of resistance of the

patient because of toxemia, dehydration or malnutrition. The bacterial toxic factor probably accounts for the patient's demise in case of those individuals who die in spite of subtotal or even total disappearance of the exudate. The vital centers have not been able to hold out against those toxins long enough for recovery to occur.

THE ALTERED ASPECT OF OTITIC ABSCESS OF THE BRAIN.

The complex picture presented by the various avenues of invasion and pathological aspects of otitic abscess of the brain has been fairly well worked out during the preantibiotic era. This was particularly true of the less well understood group of "distant" lesions in which invasion of the nervous tissues seemed to take place by way of the dural sinuses and their afferent veins. The total number of postotitic lesions in the form of actual abscess has, of course, been markedly reduced by antibiotics, as in the case of other lesions. This is clearly evident in the statistics available in the autopsy records of this hospital.

In the recent five-year period, only four cases of otitic abscess of the brain were encountered in 9,737 consecutive autopsies. One of these (No. 42-537) was an acute temporal abscess with some local subdural exudate; the second (No. 43-428) was also an acute abscess; the third (No. 45-911) was an acute diffuse abscess of the frontal lobe with an associated subdural abscess, probably resulting from a mixed infection with aerobic organisms, while the fourth (No. 47-923) was an abscess still in the stage of a local "encephalitis" in the adjacent temporal lobes. It is noteworthy that all these lesions were acute and fulminating.

In this present era the total picture of otitic abscess of the brain has been considerably modified by the use of antibiotic measures. The usual type of "adjacent" abscess of the temporal lobe and cerebellum is still occasionally encountered, due to the resistance of bacteria in case of certain instances of chronic otitis, especially when complicated by cholesteatoma formation; but the "distant" abscesses usually resulting from invasion of the intracranial venous system by way of the regional veins and the lateral sinus after acute otitis media

in early life seem to have been fairly definitely and completely eliminated.

Only one such case of this type has come to the writer's attention since antibiotics have been used—a diffuse abscess of the right frontal lobe (see Fig. 6). There remains the possibility of several variants of abscess formation to be considered; *1.* The abortive lesion in the brain without actual abscess formation; *2.* Cases in which the abscess had largely formed before effective antibiotic treatment was given, and *3.* Lesions in which antibiotic therapy was totally ineffective, especially in the case of certain mixed infections. These various possibilities will now be briefly considered.

Abortive Focal Infections of the Brain. One must recognize that the old truism about otitic abscesses of the brain has not been altered by the introduction of antibiotics; that a recurrence of a chronic otitis media, less often an acute otitis media, may be followed at once by an invasion (via regional blood vessels) of the adjacent temporal lobe or cerebellum. In this case the use of antibiotics may be followed by cure of the causative otitis media and by an interference with the complete evolution of the typical otitic abscess of the brain.

The present writer has observed one case of a boy so treated who developed convulsive seizures several years after the otitic episode. Roentgenograms of the skull showed a focus of calcification in the temporal lobe just above the middle ear. It was assumed that antibiotic measures aborted the focal brain infection but that a residual calcified scar was ultimately responsible for the convulsive seizures.

Effect of Antibiotics on An Existing Abscess. There also remains the possibility that antibiotic therapy may be started after the abscess in the brain has already been formed. In such instances the spread of infection to the adjacent brain tissue ("secondary encephalitis") to the meninges or the ventricles may be halted, and the abscess remains as a more or less quiescent lesion. One such case was recently studied in the Cajal Laboratory. It proved to be a small, well encapsulated and sharply delineated abscess of the temporal lobe. Of particular interest was the contents of the abscess, which was

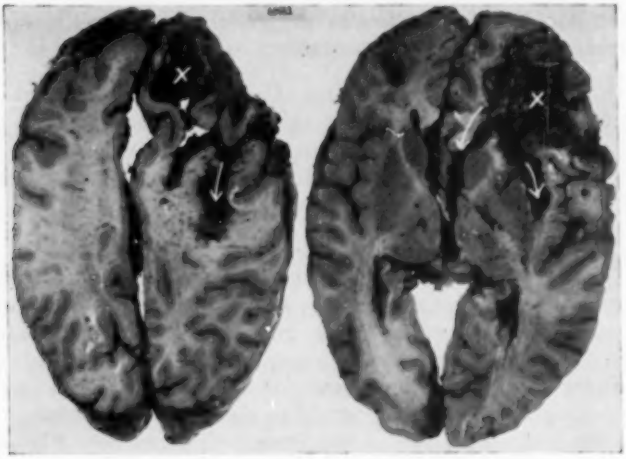

Fig. 6. Acute diffuse "distant" otitic abscess of the frontal lobe (Aut. No. 45-911). The location of this lesion and the presence of a bilateral frontal subdural abscess (see Fig. 2) suggests retrograde extension along venous channels from the middle ear on the right side. The nature of the lesion also suggests an infection with both aerobic and anaerobic organisms.

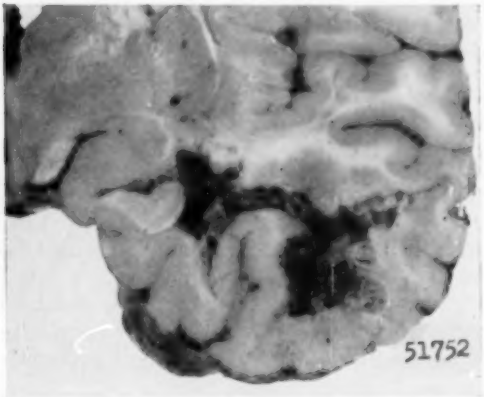

Fig. 7. Diffuse "adjacent" otitic abscess of the temporal lobe (Aut. No. 51-752). The dependent white matter of the lobe has been eroded, leaving the cortical ribbon unaffected. There was only a minimal reaction to the infection found on microscopic examination.

clear liquid with a yellowish gray flocculent precipitate, the remains of the purulent exudate.

Diffuse Abscess of the Brain. Certain German students of intracranial complications of otitis media once pointed out the occasional occurrence of acute "diffuse" widespread infections in the brain in which there was no apparent attempt on the part of the nervous tissue (white matter) to wall off the original focus.

These investigators suggested that such lesions were usually the result of invasion of the brain by multiple organisms. The rapid spread of infection in the cerebral white matter was due to the presence of aerobic organisms which would multiply rapidly in the absence of oxygen. Two such cases have recently come under study in the Cajal Laboratory. In one the lesion occurred in the frontal centrum (see Fig. 6); the other in the temporal lobe (see Fig. 7). In both instances the brain was rather widely invaded, the central white matter being destroyed to form an irregular cavity without any gross evidence of encapsulation.

It thus appears that although otitic abscesses of the brain still persist in spite of antibiotic therapy, their visage has been changed. Our concepts of this lesion must likewise be adapted to these changes unless we be misled in the diagnosis of these lesions.

SUMMARY AND CONCLUSIONS.

From a survey of recent autopsy material from cases of otitic intracranial complications, it becomes evident that while such complications have been materially reduced in incidence as much as 90 per cent, they still occur in a somewhat variable form. The greatest single accomplishment in this regard of antibiotic therapy has been the practically total elimination of dural sinus thrombosis. This is due, of course, to the prevention of mastoiditis as a complication of acute otitis media.

A study of this recent series of verified fatal complications brings to light certain important factors causative in the production of the fatal issue. In 13 of the 23 cases reviewed,

death was the result of suppurative meningitis consequent to a fulminating acute otitis media often in a dehydrated and malnourished infant. Since this is the essential situation in over half of these cases (56.5 per cent), the problem of prevention now lies in the hands of the general practitioner and the pediatrician; however, this same situation was observed in two cases in adults with an acute *clinically undetected* otitis media following an upper respiratory infection.

In five other adult cases, fatal meningitis followed acute or subacute otitic infection associated with earache and/or otorrhea. In two adults, fatal intracranial lesions (both with cerebral abscesses with associated subdural abscesses) were the direct result of a chronic draining ear with sudden development of febrile state. From this it may still be said that a patient with a chronic otitis sits on a powder keg as far as potential intracranial complications are concerned.

Meningitis has now become the chief hazard of infections of the ear as compared to other complications, although its actual incidence has also been remarkably reduced. It now occurs most commonly as a fulminating development in poorly nourished infants with an otitis due to an organism resistant to the action of antibiotics, essentially a pediatric problem. Death may result, even though the gross evidence of meningitis has largely or even completely disappeared. Infection with the meningococcus by way of the ear may also occur now as before.

Otitic abscess of the brain still occasionally causes death of patients. Such lesions are now almost invariably "adjacent" lesions of the temporal lobe rather than the cerebellum. In this group of cases, treatment with antibiotics was begun too late, or the infection was due to the presence of a resistant organism. If this organism chances to be an anaerobic variety, the brain may be rapidly and diffusely invaded ("diffuse brain abscess"). It has also become evident that after antibiotic therapy, certain pathological aspects of otitic abscess have become apparent which were rather uncommon before. This altered picture of otitic abscess of the brain must be recognized, if the clinician is to keep pace with the changing situation.

REFERENCES.

COURVILLE, CYRIL B., and NIELSEN, J. M.: Intracranial Complications of Otitis Media and Mastoiditis. Statistical Study with Survey of 10,000 Necropsies. *Acta Otolaryngol.*, 21:19-60, 1934.

COURVILLE, CYRIL B., and NIELSEN, J. M.: Fatal Complications of Otitis Media, with Particular Reference to the Intracranial Lesions in a Series of 10,000 Autopsies. *Arch. Otolaryngol.*, 19:451-501, April, 1934.

COURVILLE, CYRIL B., and NIELSEN, J. M.: Otogenous Abscess of the Parietal Lobe. Review of the Literature and Report of Six Cases. *Arch. Surg.*, 30:930-955, June, 1935.

COURVILLE, CYRIL B., and NIELSEN, J. M.: The Pathogenesis of Otogenous Abscess of the Temporal Lobe. A Preliminary Report. *West. Jour. Surg., Obst. and Gyn.*, 43:680-690, Dec., 1935.

COURVILLE, CYRIL B., and NIELSEN, J. M.: Simultaneous Otogenous Abscesses of the Left Temporal Lobe and Left Cerebellar Hemisphere. *Bull. Los Angeles Neurol. Soc.*, 1:23-25, March, 1936.

COURVILLE, CYRIL B., and NIELSEN, J. M.: Otogenous Abscess of the Parietal Lobe. A Further Report. *Bull. Los Angeles Neurol. Soc.*, 1:65-69, June, 1936.

COURVILLE, CYRIL B., and NIELSEN, J. M.: Otogenous Abscess of Frontal Lobe. Review of the Literature and Report of Five Cases. *Acta Otolaryngol.*, Supp. 21, pp. 1-72, 1937.

COURVILLE, CYRIL B., and NIELSEN, J. M.: Intracranial Complications of Otogenous Thrombosis of the Lateral Sinus. *Ann. Otol., Rhinol., and Laryngol.*, 46:13-38, March, 1937.

COURVILLE, CYRIL B., and NIELSEN, J. M.: The Pathogenesis of Otogenous Cerebellar Abscess. *California and West. Med.*, 47:29-36, July, 1937.

SOUTH CAROLINA SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY.

Plans have been completed for a joint meeting of the North Carolina Eye, Ear, Nose and Throat Society and the South Carolina Society of Ophthalmology and Otolaryngology at Columbia, S. C., on September 12, 13, and 14, 1955. Headquarters will be the Columbia Hotel.

The following ophthalmologists will be on the program: Dr. E. W. D. Norton of New York, Dr. Frank Carroll of New York, and Dr. William B. Clark of New Orleans.

An announcement of three guest otolaryngologists will be made later.

A most attractive program has been arranged. For further information address Roderick Macdonald, M.D., Secretary and Treasurer, 330 East Main Street, Rock Hill, S. C.

SYMPOSIUM:

INTRACRANIAL COMPLICATIONS OF OTITIS MEDIA AND MASTOIDITIS IN THE ANTIBIOTIC ERA.

II. Intracranial Complications of Otitis Media as Modified by Sulfa Drugs and Antibiotics—Clinical Aspects.*†

J. M. NIELSEN, M.D., (by Invitation),
Los Angeles, Calif.

Before the advent of sulfa drugs and antibiotics, students of intracranial complications of otitis media and sinusitis had worked out a system of diagnosis and treatment which was laudable. A study of the literature of the half century before the new era showed clearly that close attention and devotion to the patient with careful follow-up of changing symptomatology led the physician to a correct evaluation. The timing of surgical procedures was of great importance.

OTITIS MEDIA.

The recognized complications of otitis media were:

1. Mastoiditis.

2. Epidural abscess.

3. Meningitis.

4. Extension to the lateral sinus and to the superficial cerebral veins with distant abscesses or softening.

5. Thrombosis of the lateral sinus with its: *a.* Embolism. *b.* Labyrinthitis.

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* Read at the meeting of the Western Section, American Laryngological, Rhinological and Otological Society, Inc., Los Angeles, Calif., January 16, 1955.

† From the Department of Medicine (Neurology) U.C.L.A., and the Los Angeles General Hospital, Los Angeles, Calif.

Editor's Note: This ms. received in The Laryngoscope Office and accepted for publication January 31, 1955.

6. Temporal abscess.

7. Subdural abscess.

It was recognized that otitis media of infancy was common as an accompaniment of acute upper respiratory infections and of acute exanthemata and that it was usually bilateral. It was known that extension to the mastoid process and to the cranial contents could occur from an ear which might clear, and hence, if one ear were involved when the patient was first seen, it might be the clear ear from which extension inward had occurred.

There was a maxim among pediatricians which said, "When a child cries long without apparent cause, or if there is fever of undetermined etiology, think of the ears." It was known that, while chronic otitis media was more apt to extend inward, nevertheless acute otitis could also do so. When a draining ear ceased to drain, the physician was not necessarily happy, because it might cease because of inward extension.

In adults, otitis media was often unilateral and not as treacherous as in infants, but it tended to become stubborn and chronic from bacteroides infection.

1. MASTOIDITIS.

While mastoiditis is not actually an intracranial extension it is included here because it was a most common stepping stone to it, and because even uncomplicated mastoiditis often gave signs simulating intracranial extension. When the authors of this little symposium were studying the neurological complications of simple mastoiditis it became evident that a meningeal reaction with increased deep reflexes of the opposite side and Babinski's sign were common. All of the neurological symptoms and signs would disappear as soon as the mastoid abscess was drained.

2. EPIDURAL ABSCESS.

Epidural abscess was common with mastoiditis and would also give signs of meningeal irritation with pleocytosis, severe headache and reflex changes. When mastoidectomy was

routinely carried in to the dura (by the specialists in otology) and the abscess drained, the bottom would drop out of the neurological picture.

3. MENINGITIS.

Otitic meningitis was a dreaded complication and highly fatal; however, the diagnosis was difficult to establish, because many of the other complications would give rise to a meningeal reaction. Neurological examination was not sufficient to state whether the meninges were actually infected, and reliance on laboratory work was necessary. The finding of bacteria in the spinal fluid did not settle the issue, because they were found in meningeal reactions. Only a positive growth on culture established the diagnosis. In meningeal reactions a clearing of the focal site would put an end to the meningeal syndrome.

4. EXTENSION TO THE LATERAL SINUS AND VEINS.

When infection extended to the lateral sinus the sinus did not always thrombose. There was a tendency for infection to extend to the superficial cerebral veins and cause distant cortical thrombosis with possibility of superficial cortical abscesses. When intensive study of a case was carried out, with frequent spinal puncture, it was found that the fluid was temporarily blood-tinged during the extension. If this were not done, extension could occur undetected.

5. THROMBOSIS OF THE LATERAL SINUS.

Thrombosis of the lateral sinus was to be detected before the process reached the jugular bulb and the jugular vein. Of course, needling of the sinus would disclose the thrombosis, but a spinal puncture with a Queckenstedt rise on jugular compression on one side only would show that the sinus was occluded. When occlusion occurred it did not necessarily mean the dreaded embolism would develop. The clot would have to disintegrate first; however, fearing this, it was customary to ligate the jugular vein. Thrombosis of the jugular bulb at times caused paralysis of the IXth, Xth and XIth cranial nerves.

Moreover, from a thrombosed sigmoid sinus, extension was common to the cerebellar veins with abscess and labyrinthitis. Labyrinthitis gave rise to deafness and severe dysequilibrium with nystagmus and would simulate cerebellar abscess. This would lead to all the vestibular and cerebellar tests. Early choking of the discs was routine with cerebellar abscess, but not invariable. Differentiation between cerebellar and temporal lobe abscess was often difficult, because the nystagmus and weakness of the two simulated each other.

6. TEMPORAL ABSCESS.

The formation of an abscess in the temporal lobe by direct extension in cases under continuous observation was recognized as occurring in three stages. The acute first stage, of encephalitis, was comparable to influenza with a slight chill, fever, malaise, headache and anorexia but with a leucocytosis in the blood and a pleocytosis in the spinal fluid with polymorphonuclear predominance.

In a few days this stage would subside gradually as the pus was walled off and the patient would feel greatly improved. The second or latent stage would develop with cessation of fever, reduction of leucocytosis, change of spinal fluid cells from polymorphs to lymphocytes and gradual reduction of the cell count. The latent stage was extremely deceptive and good clinicians as well as alert residents would occasionally discharge the patient as recovered.

Then the third or manifest stage would appear with subnormal temperature, headache, changes in the eyegrounds, vomiting, perhaps aphasia or quadrantanopia—in brief, all the classical signs of a cerebral neoplasm; but with a history and adequate observation the otolaryngologist knew that the abscess was now ready for drainage. Clinicians were astute observers and diagnosticians.

7. SUBDURAL ABSCESS.

Subdural abscess was a rare complication, but was recognized even in the last century. Dr. Macewen drained such an abscess associated with a cerebellar abscess and obtained a

cure. A subdural abscess could spread over a large area and give a great variety of symptoms, but surgical diagnostic measures readily established a diagnosis.

Such was the state before sulfa drugs and antibiotics. The clinician was a meticulous observer who studied his cases and systematized his knowledge with a view to accurate recognition of pathogenesis. He knew what was going on at each stage, and it was the sequence of events that gave him his diagnosis.

Now all this is changed. The general practitioner does not make as careful a study of his case, because he has confidence in the antibiotic to subdue the infection regardless of site. He tends to forget that trapped pus does not respond to antibiotics and that surgery is necessary for cure of purulent foci anywhere.

The usual course of a case of cerebral abscess at present is as follows: The patient complains of an upper respiratory infection and receives a massive dose of penicillin or some oral preparation of an antibiotic. He improves but is not well. He complains of pain in the ear and receives another injection. He does not get well but rumbles along for a week or two.

Then vomiting appears and headache increases. Observation having been poor, the doctor does not know what has developed, but feels reasonably certain that any infection is removed. He may not even call for otolaryngological consultation, but call a neurologist instead. When examination discloses choking of the discs, and reflex changes, even he may think not of an abscess but of a neoplasm.

The consultant has had the major part of his armamentarium removed, namely the sequence of symptoms and signs, because they have been clouded over to such an extent as to be unrecognizable. If he suspects an abscess he has no way to date its development. The case is virtually without a history, and objective diagnostic methods are relied on. The surgeon wants an angiogram or air study, whereas in the past he would have tapped the abscess. The time consumed in

study and the manipulations required for evaluation increase the danger of rupture of the abscess. All that had been learned has been vitiated and diagnostic acumen has suffered.

Antibiotics have thus reduced the number of intracranial complications of otits media but have made the diagnosis when trouble appears much more difficult. They have had a destructive influence on careful observations and intensive study. They have brought with them a state of trust and confidence in the drugs which in turn lulls the observer into relative dullness. The psychological effect on the physician has been bad. Let him be alert to the fact that we still have complications hiding under a smog through which he must discern the diagnosis and effect a cure.

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RADIOISOTOPES IN THE DIAGNOSIS AND TREATMENT OF HEAD AND NECK CONDITIONS.*†

HENRY L. JAFFE, M.D.,

and

WARREN J. ZAGER, M.D.,

(by invitation.),

Los Angeles, Calif.

Radioactive isotopes have been administered internally in tracer amounts for various diagnostic purposes and in larger does for therapy. Artificially produced radioactive material has been applied topically for the treatment of certain skin lesions and has been used externally in very large amounts for teletherapy machines or so-called "cobalt bombs."

The intracavitary use of radioactive cobalt is similar to radium. Cobalt is less expensive than radium and can be machined; therefore, it is possible to construct various applicators of this material that will more properly fit the physical needs of each case.

Radioactive colloids have been injected interstitially, and radioactive seeds and needles have also been inserted into and about tumor sites. The use of nylon threads containing radioactive substances has been reported. The following briefly describes some of the special diagnostic and therapeutic applications of radioactive isotopes in head and neck conditions.

DIAGNOSTIC USES.

1. Eye Tumors:

Neoplastic tissue contains a larger amount of nucleoprotein

* Read at the meeting of the Western Section, American Laryngological, Rhinological and Otological Society, Inc., January 16, 1955.

† From the Department of Radiation Therapy, Cedars of Lebanon Hospital, and Department of Radiology (Therapeutic), University of Southern California School of Medicine. Aided by research grants in memory of Roberta Flournoy Shaw, Helen W. Daniels, and Mary Arnold.

Editor's Note: This ms. received in The Laryngoscope Office and accepted for publication January 31, 1955.

than normal tissue. The more rapidly the tissue grows, the more nucleoprotein will be present in the tumor. When a tracer dose of radioactive phosphorus is injected intravenously, it is taken up in larger amounts by tumor tissue than normal tissue. For this reason, it may be possible to detect the presence of an eye tumor by making readings over the eye with a specially constructed small Geiger counter which has an extremely thin end window.

P^{32} uptake studies are valuable adjuncts to careful clinical evaluation of suspected eye tumors, rather than conclusive diagnostic tests. Thomas, Krohmer and Storaasli[1] first described this technique in 1952. They found a positive uptake in five of eight patients, and each of these five patients proved to have a malignant melanoma of the retina.

Krohmer, Thomas, Storaasli and Friedell[2] in 1953 reported their results in 32 cases. A selective uptake was recorded as the ratio of the count over the suspected site to that over a normal portion of the eye. They concluded that a selective uptake ratio of 1.4 or higher in the anterior segment is very suggestive of tumor, while a selective uptake ratio of less than 1.2 over the anterior segment strongly indicates a non-neoplastic process. The uptake ratio for posterior tumors apparently was somewhat less reliable. Included in this series were nine proved anterior tumors, three proved posterior tumors, and 14 non-neoplastic lesions. Six cases were not tabulated, because a definite histopathologic diagnosis was not made.

Bettman and Fellows[3] investigated the distribution of P^{32} in the eye after intravenous injection. They found that the P^{32} is present in greatest concentration in the extra-ocular muscles, and is taken up in decreasing concentration in the choroid and retina, ciliary body, cornea, lens capsule and cortex, aqueous, sclera, vitreous, and least of all in the lens nucleus.

In view of the fact that the vitreous, aqueous, lens and sclera are relatively inert and take up very little P^{32}, the count obtained over the eye is almost entirely from the P^{32} in the uveal tract and retina. Great care must be taken to avoid the

error of a false increased uptake of the tracer resulting from the placing of the tube over the rectus muscles of the eye.

2. Brain Tumors:

In 1949 Selverstone, Solomon and Sweet[4] described their technique of the localization of brain tumors during surgery by using a pure beta emitter, radioactive phosphorous (P^{32}). They found that the increased uptake of the P^{32} tracer was related to the increased amount of nucleo-protein in the brain tumor. They employed a specially constructed Geiger counter shaped in the form of a needle probe which could be sterilized and then inserted directly into the brain tissue following craniotomy.

When the patient was given a tracer dose of P^{32} intravenously, the needle probe counter could detect the increased uptake of P^{32}, which ranged from 6 to 110 times greater in brain tumors than in normal white matter. Although the uptake of P^{32} in the gray matter of the brain was somewhat greater than that of white matter, it never approached the high degree of uptake in tumor tissue.

Ashkenazy, Davis and Martin[5] in 1950 reported their technique of localizing brain tumors with the aid of radioactive diiodofluorescein. It is believed that the increased radioactivity in the tumor site is due to the change in the blood brain barrier which permits a greater concentration of the tracer substance in the tumor site.

In 340 patients suspected of having central nervous system tumors, they found only 17 proven inaccuracies in their test, making a total accuracy of 95 per cent. They gave the patient an intravenous injection of 1 millicurie of radioactive diiodofluorescin tagged with I^{131}, and then made readings over the entire skull with a heavily shielded Geiger counter.

Human serum albumin tagged with I^{131} has also been used, and this isotope appears to be more satisfactory because it is more stable, thus making possible recheck examinations in the same patients for as long as one to three days after the initial injection of the isotope tracer. A shielded scintillation counter, which is many times more sensitive than the Geiger counter is now used, making it possible to detect the gamma

rays coming from the tracer. It has also been possible to detect some metastatic brain tumors by this method.

The brain tumor test should not be performed immediately after trauma or soon after certain diagnostic X-ray procedures, such as angiography. There may be a change in the blood brain barrier as a result of this trauma which might result in a false positive uptake of the tracer material. Usually the more anaplastic brain tumors and the more vascular neoplastic lesions take up the greatest amount of the radioactive material.

Benign lesions may show very little uptake, and cystic lesions may actually show a decreased uptake as compared to the normal tissue on the opposite side of the brain. A positive test should show an increase of more than 15 per cent in the uptake of the tracer material in the suspected area as compared to the corresponding area on the opposite normal side of the brain. This increased uptake should be detectable on repeated examinations made several hours apart. Subdural hematomas may sometimes give readings which simulate those of brain tumors.

In 1951 Sweet[6] described a method using radioactive postasium (K^{42}). This isotope emits gamma rays and was found to concentrate extremely well in brain tumors. Since it also concentrates in muscle tissue, its use must be restricted to tumors located in those portions of the skull not covered by thick layers of muscle.

More recently Sweet and Brownell[7] have described the use of arsenic[74] for the localization of brain tumors. This material concentrates in a ratio of 5 to 1 in brain tumor tissue over normal brain tissue. Thus, if the neoplasm does not present itself on the surface of the brain nor distort the convolution sufficiently to allow its detection after the dura has been opened, it is possible to attempt radioisotope localization by inserting the fine probe-type Geiger counter into the brain tissue. This probe measures about 2mm. in diameter. This type of localization makes it possible to prevent extensive mutilation of brain tissue by surgical exploratory means.

We agree with the recent report of Seaman[8] that the clinical

status of this test is yet to be definitely determined; however, we feel that it is a useful screening procedure to aid in the selection of patients for further diagnostic studies. The failure to localize a brain tumor may be the result of an unfavorable location, or biological characteristic that interferes with the basic mechanism of localization of the medium.

3. Thyroid Disease:

One of the earliest and most commonly employed isotope tracer techniques has been the use of radioactive iodine for

Fig. 1.

the study of thyroid function (see Fig. 1). In 1950 we reported that this diagnostic test proved to be more accurate for the study of thyroid function than the basal metabolism test and the protein-bound blood iodine test. The thyroid gland normally concentrates iodine in a proportion of at least 2,000 to 1 over any other tissue of the body.

When this iodine binding power is decreased, due to thyroid disease or as a result of surgical removal of the gland, there is a detectable decrease of the amount of uptake of the

radioiodine tracer. When the thyroid gland is overactive, the uptake of the tracer dose of radioiodine is usually above normal limits; thus a measure of the amount of radioiodine uptake or concentration by the thyroid gland along with the clinical study of the patient is an excellent means for determining whether thyroid function is low, normal or high.

The authors routinely follow the 24-hour thyroid uptake study by a 48-hour scan of the thyroid area to make a "thy-

Fig. 2.

rogram" (see Fig. 2). A normal picture shows a uniform uptake of the tracer in both lobes in average amounts. No "cold" or "hot" spots are seen (see Fig. 3).

When the gland is overactive the thyrogram picture is very dark. In the case of hyperthyroidism, or Graves' disease, both lobes are usually involved and show a diffusely increased uptake throughout, and may actually be increased in size (see Fig. 4). In myxedema the uptake is very low in both lobes (see Fig. 5).

Occasionally, a single toxic nodule is found in one lobe

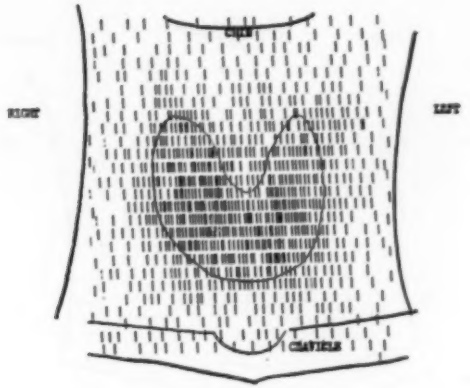
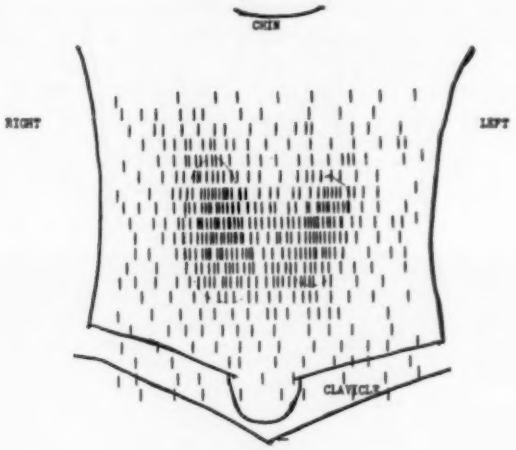


Fig. 3.

which interferes with the function of the normal lobe (see Fig. 6A-B).

Following total thyroidectomy for carcinoma of the thyroid gland, a scan over the neck may show no uptake (see Fig. 7); however, 24 hours after an intramuscular injection of thyroid stimulating hormone (TSH) the test is repeated, and an uptake may be demonstrable in residual thyroid tissue (see Fig. 8).

Fig. 4.



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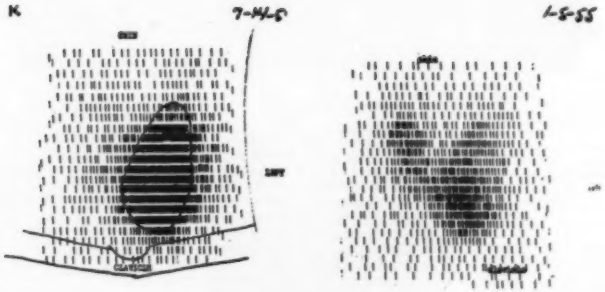

Fig. 6.

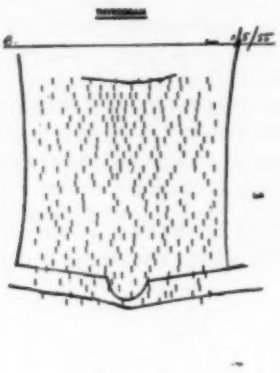

Fig. 7.

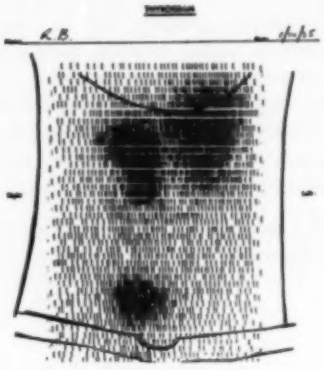

Fig. 8.

In 1954 our group[10] reported the use of a tracer dose of radioactive iodine to help establish the diagnosis of a posterior mediastinal goiter.

The thyrogram also helps determine the function of single

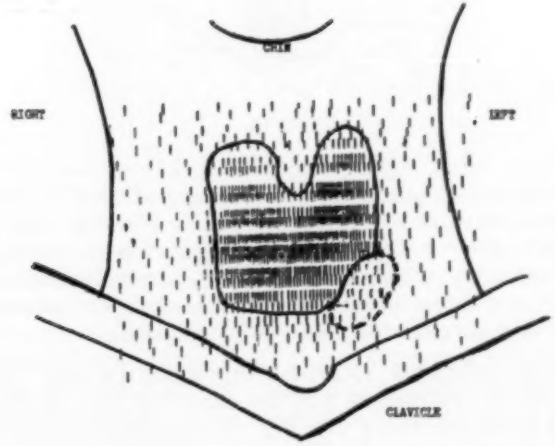

Fig. 9.

or multiple nodules in the thyroid gland. If a single nodule or multiple nodules fail to take up radioactive iodine, it is termed a "cold" nodule (see Fig. 9). This, therefore, represents nonfunctioning or poorly functioning thyroid tissue and may indicate the presence of a neoplasm, a nonfunctioning adenoma, an area of thyroiditis, or a cyst. A biopsy is usually advised for these "cold" nodules, and appropriate surgical treatment is carried out if maligancy is found.

If a nodule takes up a large amount of radioactive iodine it represents a hyperfunctioning nodule which usually is benign.

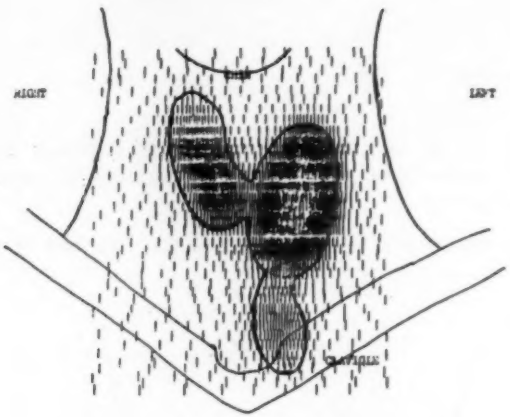

Fig. 10.

The presence of carcinoma in this type of "hot" nodule is extremely rare. If the uptake of the I^{131} tracer is high, it is possible to destroy this "hot" nodule by radioactive iodine. If, after radioiodine therapy, the follow-up thyrogram shows that there is a residual nodule which takes up very little radioiodine, then surgical intervention is indicated.

Post-thyroidectomy recurrent thyrotoxicosis may be detected by the thyrogram and the extent of the regenerated thyroid tissue visualized (see Fig. 10). Following radioiodine treatment, the return of the gland to more normal status

may be followed by the post-treatment thyrogram (see Fig. 11). In acute thyroiditis a very low uptake of the radioiodine tracer is found. A thyroglossal cyst shows an absence of uptake of radioiodine in the cystic area.

When a lingual thyroid is suspected clinically, the thyrogram will usually demonstrate the aberrant thyroid tissue in the tongue (see Fig. 12). A negative uptake of the radioiodine tracer will help exclude the possibility of the lesion being of thyroid tissue origin.

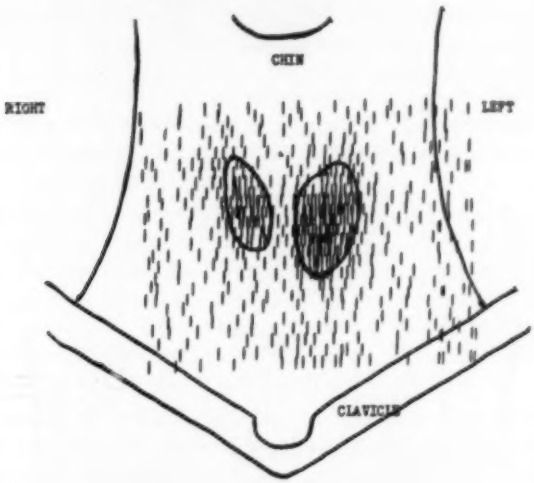

Fig. 11.

Substernal thyroid tissue may be demonstrated by both the uptake of radioiodine and the scintiscanner picture (see Fig. 13). When so-called lateral aberrant thyroid tissue is clinically suspected in the cervical region, an uptake study and a scan of the neck may help confirm the presence of thyroid tissue metastasis; however, since many of these tumors show pure papillary structure histologically, they usually do not concentrate radioiodine. The alveolar and the follicular thyroid neoplasms are the ones which concentrate radioiodine to the highest degree, and the mixed papillary thyroid tumor may concentrate some radioiodine.

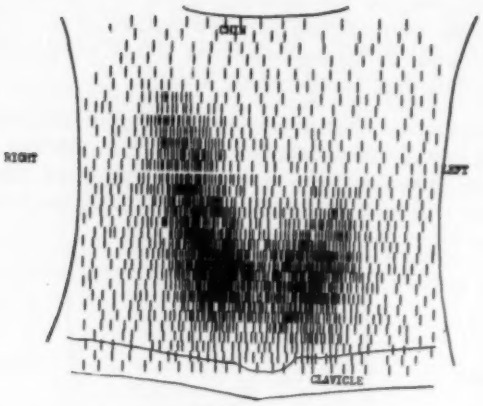

Fig. 12.

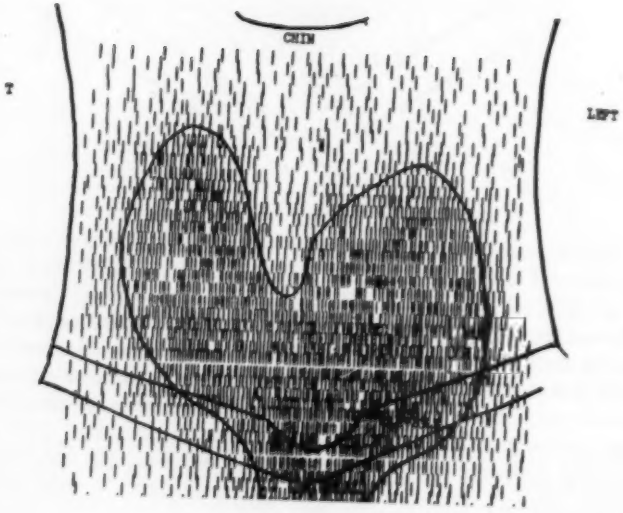

Fig. 13.

THERAPEUTIC USES.

It is well known that the biological effect of nuclear radiation is due to ionization. The therapeutic value of such radiation depends upon increased sensitivity to ionization of diseased cells, and thus their preferential destruction over normal cells; it also depends on the fact that after the partial or complete destruction of tissue cells the recovery mechanism of tissue is such that predominantly normal cells will be regenerated.

Radioisotopes have been useful in the treatment of certain benign conditions, such as thyrotoxicosis, and have also contributed to cancer therapy during recent years. The results in cancer therapy cannot be finally evaluated, since there has not been enough time for long term statistical evaluation. The palliative benefit of radioisotope treatment in certain types of cancer has been striking.

Therapeutically, radioisotopes may be administered internally or may be placed externally as a radiation source. For internal use two modes of placement are available, namely, biochemical and physical. An example of biochemical placement is where the host organ, such as the thyroid gland, shows a special affinity for the radioisotope because the thyroid gland uses iodine in its normal metabolism.

The uptake of radiophosphorus by nucleoprotein in tumor tissue is another example of biochemical placement. An example of physical placement is the interstitial use of radiocolloids for the treatment of tumors. External use of radioisotopes includes surface application by plaques or other applicators, and by beam irradiation by teletherapy units.

1. Eye Disease:

Strontium^{90} is a fission product, and when made up into a plaque for the treatment of eye lesions is an excellent source of pure beta radiation with two continuous spectra, namely that of strontium^{90} and yttrium.^{90} It has a physical half-life of 20 years. Friedell, Thomas and Krohmer[11] in 1950 reported that strontium^{90} beta rays had the same biological effectiveness when applied clinically as the beta rays from radon which had been used in a similar series of cases. All treat-

ments with strontium^{90} must be given by direct contact, since this is the only manner in which the actual dose to the tissue can be carefully regulated.

This applicator has been useful for the treatment of superficial diseases of the eye, such as small benign tumors, especially papillomata of the lids and conjunctiva, Bowen's disease or intra-epithelial epitheliomas, angiomata of the lids and conjunctiva in infants, and pterygia. Early cases of vernal conjunctivitis often show an excellent therapeutic response to beta radiation.

Vascularization of the cornea is another condition which may be successfully treated. Vascular obliteration has been favorable after superficial keratectomy, and as a preliminary procedure to corneal transplant where there are invading vessels of the cornea. Treatment has also been given following corneal transplants where there is a possibility of vessels reinfiltrating the graft from the surrounding cornea. In vascularized corneal leukomas, associated with irritability, and in chemical burns of the cornea, great relief may be obtained by beta radiation.

Certain forms of chronic ulcer of the cornea have healed after beta radiation therapy has been applied to the limbal region directly adjacent to the ulceration. The dosage at the surface of the eye where the applicator makes contact with the tissue is 100 per cent, and because there is only beta radiation the dosage rate drops off rapidly, so that at 3 mm. depth there is only 12 per cent of the surface dose present. This minimizes the danger of producing a radiation cataract of the lens.

2. Brain Tumors:

A cobalt teletherapy machine (see Fig. 14) has been developed through the cooperative effort of the Teletherapy Evaluation Board of the Oak Ridge Institute of Nuclear Studies. This type of machine has recently been installed at the Cedars of Lebanon Hospital in Los Angeles, and it contains 1066 curies of radioactive cobalt.^{60} Cobalt^{60} has a half-life of 5.3 years, gives off a very strong gamma ray equivalent to the output of a 3,000,000 volt X-ray machine.

It is possible to deliver large doses of radiation to inoperable brain tumors without producing the intense reaction in surrounding normal tissues which we formerly observed with conventional deep X-ray therapy. The addition of rotation therapy techniques permits the delivery of a large axis tumor

Fig. 14.

dose without producing severe skin and bone reactions, and with a minimum of radiation sickness.

In order to deliver intensive radiation directly to the tumor site, we have injected radioactive colloidal chromic phosphate (P^{32}) locally at the time of surgery when we have found an inoperable brain tumor. We have developed a special syringe with a plastic shield which protects the operator during the injection treatment (see Fig. 15).

The radioactive phosphorous (P^{32}) is a pure beta ray mate-

rial which acts locally over a range of only a few millimeters. This prevents destruction of adjacent normal tissue. Radioactive gold[198] in the form of seeds or wire may also be introduced into the tumor tissue in much the same manner as radon seeds. The short half-life of radiogold, 2.7 days, presents a practical problem since the material may not be available when it is needed. The longer half-life of chromic phos-

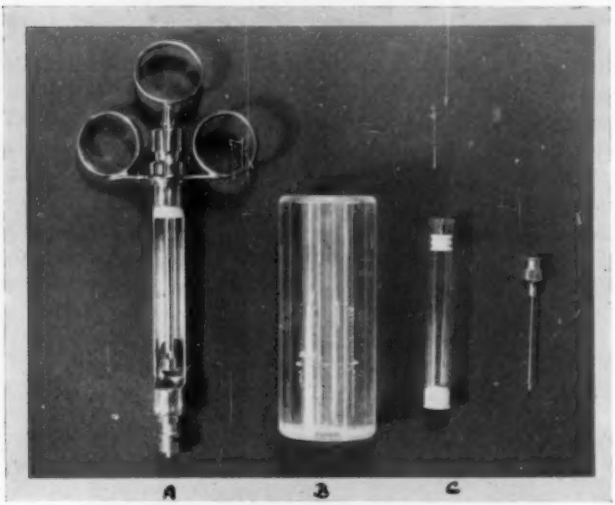

Fig. 15.

phate, 14.3 days, makes it possible to have this material on hand for use in the operating room at all times.

3. Nasal Cavity and Paranasal Sinuses:

It is possible to use radioisotope needles, tubes, beads and specially constructed applicators. These may be inserted after surgical exploration, and the larger variety of shapes and sizes available facilitates a more homogeneous distribution of the radiation sources. The intracavitary therapy may be followed by external radiation with the cobalt teletherapy ap-

paratus. The advantage of this combination of isotope treatment is that a maximum amount of tumor dose may be given with a minimal danger of postradiation bone necrosis and atrophy of the skin and mucous membranes.

4. Tumors of the Tongue, Floor of the Mouth and Palate:

In addition to using radiocobalt needles, or radiogold seeds, it has been possible to inject radioactive colloidal chromic phosphate for the local destruction of tumor tissue. The preliminary work looks hopeful, but it will require a longer term of observation for evaluation. The cobalt teletherapy machine is also used for external radiation in place of the conventional deep X-ray therapy at 200-250 KV.

Henschke, of Ohio State University Medical School, has recently described the use of iridium^{192} in nylon ribbons for the irradiation of soft tissue tumor masses. Multiple small seeds of the isotope are held in place in fine nylon ribbon. The ribbon is sutured in various planes to encompass the entire neoplasm. The iridium nylon material is more comfortable for the patient than the introduction of rigid radioactive needles and tubes and, therefore, is particularly useful for lesions of the tongue and soft tissues of the mouth.

5. Nasopharynx, Larynx and Esophagus:

The use of teletherapy with large sources of cobalt^{60} makes it possible to obtain a high energy output of radiation simulating the super-voltage of 3,000,000 volt X-rays. This permits rotation therapy techniques, which should afford the advantage of delivering adequate cancerocidal doses without the dangers of postradiation sequelae noted with conventional deep X-ray therapy. It is too early to evaluate and compare the results of this form of radiation therapy with conventional X-ray therapy; however, with the use of the newer radiation techniques, there is a theoretical basis for optimism.

The use of specially constructed phantoms, permitting accurate determination of tumor dosage, will assure the delivery of the necessary lethal dose of radiation to the tumor. The use of fluoroscopic screens and television cameras during rotation therapy, together with the remote control apparatus

of the rotation chair, will permit the continuous accurate placement of the patient and the delivery of the radiation in a more precise manner. This may also have a favorable effect on the end results.

6. Thyroid Disease:

Radioactive iodine (I^{131}) has a physical half-life of eight days. We have used it successfully in more than a thousand patients for the treatment of hyperthyroidism. It is given orally in one or more doses. The results of radioiodine therapy are as good as those previously reported for thyroidectomy.

In the treatment of carcinoma of the thyroid gland, the biochemical placement factor unfortunately holds true in only about 10 to 15 per cent of all of these cases. The pure papillary form of carcinoma of the thyroid gland does not take up very much radioactive iodine; therefore, it has no value in the treatment of this type of thyroid cancer. The mixed papillary and follicular histological types, as well as the alveolar type of thyroid cancer, do take up radioiodine, and, therefore, better results may be expected.

We routinely recommend that a tracer dose of radioiodine be given to each patient prior to thyroid surgery, so that when the pathologist finds the presence of thyroid cancer we have an opportunity to make a radioautograph of the removed tissue. The radioautograph shows us whether or not the tumor cells take up radioiodine, and helps settle the question of whether radioiodine treatment will be of therapeutic value for each case.

A total thyroidectomy and neck dissection should be the primary form of treatment where indicated for thyroid cancer, and radioiodine should be used as a postoperative therapeutic measure when indicated.

A recent report by Black, Woolner and Blackburn[12] reviewed 128 cases of carcinoma of the thyroid gland in which radioiodine was employed diagnostically or therapeutically. Twenty of 23 lesions classified as the follicular type of papillary adenocarcinoma, or as either the follicular and mixed follicular and solid type of malignant adenoma, concentrated

iodine or could be stimulated to do so by ablation of the functioning thyroid tissue and the administration of thiouracil. Fourteen of 28 cases of mixed follicular and papillary type of adenocarcinoma accumulated iodine to variable degrees.

The papillary type of papillary adenocarcinoma, solid and Hurthle-cell types of malignant adenoma and anaplastic adenocarcinoma almost never concentrated nor could they be stimulated to concentrate iodine. Following thyroidectomy we advise the removal of any remaining thyroid tissue by treatment with radioiodine.

The primary purpose of this total ablation is to remove the inhibition of function of any possible foci of thyroid malignancy. This may make it possible to detect functioning metastatic thyroid lesions by the administration of tracer doses of radioiodine followed by scanning of the entire body with a Geiger counter or scintillation counter. If a positive uptake is found in a metastatic focus, then radioiodine treatment is administered.

7. The Neck:

Metastatic carcinoma to the lymph nodes of the neck may be treated by radioisotopes when there is an indication for radiation therapy. Radioactive cobalt in needles, radiogold in seeds, iridium in nylon threads, and injectable radiocolloids represent more flexible means of applying radiation therapy than was previously available with radium needles or radon seeds.

Because the original cost of the isotope is much less than an equivalent amount of radium, it is possible for each institution to have a greater variety of radiation materials available for the physical placement of this type of treatment. It is also possible in certain cases to give additional external radiation therapy by means of the cobalt teletherapy machine after a maximum amount of external radiation has been given with a conventional deep X-ray therapy machine. Occasionally, this added treatment will result in more palliative benefit for the patient. The availability of radioisotopes for the treatment of neck cancer has not changed the indication for radical neck dissection.

REFERENCES.

1. Thomas, Charles, I.; Krohmer, Jack S., and Storaasli, John P.: Detection of Intraocular Tumors with Radioactive Phosphorus; Preliminary Report with Special Reference to Differentiation of Cause of Retinal Separation. *A.M.A. Arch. of Ophthal.*, 47:276, March, 1952.

2. Krohmer, Jack S.; Thomas, Charles I.; Storaasli, John P., and Friedell, Hymer L.: Detection of Intraocular Tumors with the Use of Radioactive Phosphorus. *Radiol.*, 61:916-921, Dec., 1953.

3. Bettman, J. W., and Fellows, V.: Radioactive Phosphorus as a Diagnostic Aid in Ophthalmology. *A.M.A. Arch. of Ophthal.*, 51:171, Feb., 1954.

4. Selverstone, B.; Solomon, A. K., and Sweet, W. H.: Location of Brain Tumors by Means of Radioactive Phosphorus. *Jour. A.M.A.*, 140: 277-278, May 21, 1949.

5. Ashkenazy, Moses; Davis, Loyal, and Martin, John: An Evaluation of the Technique and Results of the Radioactive Di-iodo-fluorescein Test for the Localization of Intracranial Lesions. *Jour. of Neurosurg.*, 8:300-314, 1951.

6. Sweet, William H.: The Uses of Nuclear Disintegration in the Diagnosis and Treatment of Brain Tumor. *N. Eng. Jour. Med.*, 245:875-878, Dec., 1951.

7. Brownell, Gordon L., and Sweet, William H.: Localization of Brain Tumors with Positron Emitters. *Nucleonics*, 11:40-45, Nov., 1953.

8. Seaman, William B.; Ter-Pogassian, Michael M., and Schwartz, Henry G.: Localization of Intracranial Neoplasms with Radioactive Isotopes. *Radiol.*, 62:30 36, Jan., 1954.

9. Jaffe, Henry L., and Ottoman, Richard E.: Evaluation of Radioiodine Test for Thyroid Function. *Jour. A.M.A.*, 143:515-519, June 10, 1950.

10. Lichtenstein, Irving; Rabwin, Marcus H., and Jaffe, Henry L.: So-called Posterior Mediastinal Goiter. *N. Eng. Jour. Med.*, 250:875-877, May 20, 1954.

COURSE IN LARYNGOLOGY AND LARYNGEAL SURGERY.

The next course in Laryngology and Laryngeal Surgery to be given by the Temple University School of Medicine is scheduled for March 28 to April 8, 1955, under the direction of Dr. Chevalier L. Jackson.

GLOBUS.*

MEADE MOHUN, M.D.,†

San Mateo, Calif.

Globus is a condition that is described as a feeling of a lump in the throat on swallowing, which is purely subjective. The older descriptions of globus always describe this as an hysterical phenomenon. Hysteria is defined as a symbolic expression of an emotional conflict. Today, many pathological conditions are known to be capable of giving a sensation of a lump or an obstruction in the throat and must be carefully ruled out, but it remains true that the great majority of patients with such symptoms have no organic basis for them.

Some of the organic conditions occasionally associated with the globus symptoms and always to be kept in mind are:

1. It is felt by some observers that an acute tonsillitis, lingual or faucial, acute pharyngitis or laryngitis, causing hyperesthesia may leave in its wake areas of anesthesia which give rise to a sensation of a lump. This sensation (neuritis) may also follow a temporary lodging of a chicken or fish bone and may persist, in a sensitive individual, and focus the patient's attention on the throat long after the foreign body is removed.

2. Hyperplasia of lymphoid tissue following an acute infection, especially in the lingual and lateral pharyngeal areas, may persist and become noticeable to the patient. Some believe this is more apt to occur if a prominent cervical vertebra is present in this area.

3. Atrophic changes in the pharynx accompanied by anemia usually in middle-aged women, described by Vinson.[1]

4. Webs at the entrance of the esophagus, described by Mosher.[2]

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* Read at the meeting of the Western Section, American Laryngological, Rhinological and Otological Society, Inc., Los Angeles, Calif., January 16, 1955.

† Division of Otolaryngology, Division of Surgery of Stanford University School of Medicine.

Editor's Note: This ms. received in The Laryngoscope Office and accepted for publication January 31, 1955.

5. Cervical disc atrophy with spurring, described by Rigby.[3]

6. In the tonsillar fossa, cysts, calculi, scar tissue and encysted abscesses.

7. Elongated uvula. Elongated styloid process.

8. Thyroglossal duct cyst. Lingual tonsil hypertrophy. Cysts of the lingual area. Enlargement of the thyroid gland, especially substernally, either from goiter or tumor. Thyroiditis and thyroid tumors.

9. Lateral pharyngeal pouches. Branchogenic cysts and fistulae of the neck.

10. Tumors and malignant infiltration of the nasopharynx and hypopharynx.

11. Laryngeal and intratracheal lesions, cysts, tumors and so forth.

12. Lesions of the esophagus. *a.* Diverticuli. *b.* Pulsion, mainly on the posterior wall at the pharyngo-esophageal region. *c.* Traction diverticuli mostly on the anterior wall at the bifurcation of the trachea. *d.* Traction pulsion diverticulum. *e.* Transient diverticulum. *f.* Cardiospasm. *g.* Benign and malignant tumors of the esophagus. *h.* Foreign bodies in the esophagus. *i.* Peptic ulcer of the esophagus. *j.* Esophagitis. *k.* Scleroderma. *l.* Riedel's struma. *m.* Diaphragmatic hernia. *n.* Extraesophageal lesions causing displacement and compression. *o.* Congenital anomalies of the esophagus, of position, of formation and of aortic arch.

13. Marked dilatation of the left auricle.

14. Hodgkin's disease. Tumors and abscess of the lung.

15. Kyphoscoliosis.

16. Aneurysm of the aorta. Pericarditis with effusion.

17. Myasthenia gravis and bulbar paralysis.

In spite of this imposing array of pathological conditions which are potentially capable of producing varied throat symptoms, a great majority of patients finding their way to

a physician's office today with this complaint do not fit into any of these categories. After a very complete and exhaustive study of the vast majority of the patients with this symptom complex, we usually wind up with a diagnosis of "No demonstrable pathology."

The great question then arises, "Are these patients truly hysterical and psychoneurotic? Do they need deep psychotherapy, or can we adopt an easier technique of light psychotherapy accompanied by reassurance and simple explanation of the fear mechanism leading to a constructing sensation in the throat?" In our experience, this type of psychotherapy, along with some sedation, appears to be somewhat helpful but seldom curative.

The present modern-day case, which is being seen with increasing frequency in the average physician's office, fits more into a simple anxiety tension syndrome; more of a case where an individual is stuck with some emotional problem, or problems, and being unable to get rid of it is still unable to accept it or swallow it. The history usually discloses that a great many of these patients are either under considerable physical or emotional stress, and usually a combination of both. Many of the emotional factors here are on a very real basis, either because of marital, in-law, children, or financial problems, and they appear to need some greater prop than the airing of their problems, reassurance and sedation.

To draw on some of Hilger's[4] recent articles, we may state that many of these patients have inherited a hypothalamus that just cannot stand up under too much stress and continue to maintain a balanced, peripheral expression of the autonomic system. The hypothalamus is a nuclear center for the central autonomic system.

Its associated pathways are not clearly understood, but there is considerable evidence that it has connections with the psychomotor centers of the frontal lobe, and it is through these connections that emotional influence and stress is transmitted from the frontal lobe to the hypothalamus.

From the hypothalamus, these central autonomic impulses are transmitted to the body by two pathways:

1. An indirect route via the pituitary gland and hence

through the glandular chain; in this way humoral control is exercised over the body and personality.

2. The other pathway is through the peripheral autonomic pathways with definite nuclear centers. If there are not too many uncontrollable emotional responses from the frontal lobe to the hypothalamus, and if the hypothalamus is a rugged receptor and capable of sending out balanced responses, then the resulting peripheral expression via the pituitary and the autonomic system remains coordinated, and the patient will feel correspondingly well; but if a disorganized peripheral response occurs as a result of undue environmental stimuli, and with which the patient's hypothalamus cannot cope, then either an acute or chronic disturbance of some end organ may occur.

In our own practice of otolaryngology, this may occur in the nose, as in vasomotor rhinitis; in the ear, as Meniere's and the various pseudo-Meniere syndromes; in the throat as globus; in the head as cephalgias and migraine; in cranial nerve involvements as in facial nerve paralysis, etc.

This control, or disordered control, is carried out by neurovascular, neuromuscular and neurosecretory mechanisms.

When there is excessive sympathetic stimulation, it may result in end-artery spasm. End-artery spasm may also result from antigen-antibody reaction in the smooth muscle sphincter, bringing allergy into the picture. The end-artery spasm throws out the delicate balance between the artery-capillary-venule system. Passive dilatation of the capillary venous network occurs, sludging of the blood takes place, and there is extravasation of transudate into the surrounding intravascular spaces. Such localized edema may be one source of the sensation of globus.

In addition to the effect on neurovascular control, these excessive sympathetic stimuli may affect the peripheral neuromuscular mechanism, resulting in spasm of the pharyngeal-esophageal musculature, more especially the crico-pharyngeus, from which a sensation of globus will result.

Accepting the above cause, that is disordered hypothalamic

response as providing the answer to many of these cases of globus, the ones with no demonstrable pathology led to the trial use of Rauwiloid drugs. It is in this type of case where we have simple, emotional tension, or anxiety and fear, that the effect of the Rauwiloid drugs has been so efficacious. In the deeper psychoses, it works the same way; namely, in relieving the anxiety tension rather than the basic delusions, confusions or hallucinations. Serpasil or Seserpoid appeared to be the extract most suitable for this work. Plummer[5] and associates have stated that the action of Serpasil may be due to a protective influence which the drug provides for the central autonomic centers against stimulations of various types coming from peripheral or frontal cortical areas, a partial suppression of sympathetic predominance at the hypothalamic level.

During the past year, 30 patients complaining of the symptoms of globus were treated by the drug Serpasil. All of these cases were first carefully checked over to eliminate organic pathology. They were all given a complete physical check by the internist, as well as by the laryngologist. All had barium studies, and a certain number had endoral examination.

Of these 30 cases, eight had more than the usual amount of lingual tonsil. These cases had the lingual tonsils reduced in size by the use of a curved electrode and diathermic destruction. No particular improvement in the symptoms of globus was noticed in six of the patients. Two of the patients felt there was some improvement. Six other patients had diathermic destruction of hypertrophied lymphoid tissue on the posterior wall. Five of these patients showed no particular improvement of the symptom of globus; one felt improved. Approximately 35 per cent of these 30 cases showed lipping of the anterior borders of the cervical vertebra.

A series of lateral X-ray studies of the neck in patients of approximately the same age bracket was studied. These patients all had complaints other than globus. The percentage of vertebral lipping was essentially the same in both series.

Of the 30 cases treated with Serpasil, six were lost track of and could not be followed further; 24 were followed closely; five of the cases showed no definite improvement. Of these

five cases, one exhibited marked nasal stuffiness, and we had to discontinue the medication. Two cases had symptoms which were not definitely those of globus. Their symptoms were multiple and fleeting, and these patients were not sure they were helped.

Two cases showed marked psychotic disturbances, and these were referred to a psychiatrist. The remaining 19 cases showed rather marked improvement, to complete cure. Patients who had lipping of the vertebrae were all relieved of the sensation of globus by the use of Serpasil; also the patients who had hypertrophied lymphoid tissue, either of the lingual or pharyngeal areas and were not relieved by removal of this tissue, were helped by the drug.

Most of these patients are still taking the medication in doses ranging from 0.1 mg. to 0.5 mg. per day, and remaining mostly free of this complaint.

These patients have likewise appeared greatly improved in their general outlook, in spite of the fact that most of them still have considerable emotional or physical stress to combat in their daily living. A number of these patients take the drug on and off. according to their symptomatology and their life stress situations.

As to why some people respond to stress and strain with such a symptom as globus while others respond entirely differently, is difficult to answer. Quoting from L. G. Moench,[6] "One of the puzzles in psychosomatic medicine is syndrome selection; why certain people develop one syndrome and others develop a different one; why one person gets asthma, another ulcers; another, hypertension, and a fourth, ulcerative colitis, etc. Social and economic position may influence the choice of disease."

Three cases of rather typical migraine with hereditary history have been treated by this drug. Two of the cases with weekly bouts of migraine have held their headaches in more or less complete check for over six months. In order to do this, it has been necessary to work the dosage back and forth to obtain the minimum dosage required to keep the headaches in abeyance, and to allow them freedom from undue lessening

of their normal drive. A third patient has an occasional bout of ophthalmic aura, but this is not followed by the headaches as a rule, and usually one aspirin will relieve this quickly.

Aldrich[7] speaks of environmental modification, clarification, insight development and psychological support as being most essential in overcoming neurotic and emotional problems. With the marked lessening of the apprehension and tension of a patient, by the use of Serpasil, the patient puts himself in a much better position to develop and utilize these steps out of his problems. It is in such a role that the use of the drugs of the Rauwolfia family are offered for further study.

BIBLIOGRAPHY.

1. Vinson, Porter P.: The Book on the Diagnosis and Treatment of Diseases of the Esophagus, 1940.

2. Mosher, H. P.: Cardiospasm. The Laryngoscope, Vol. XXXII, May, 1922.

3. Rigby, Ralph G.: The Present Status of Globus Hystericus. The Laryngoscope, Vol. LXII, April, 1952.

4. Hilger, Jerome A.: Autonomic Dysfunction in Otolaryngology. *Trans. American Academy*, Sept.-Oct., 1951.

5. Plummer, A. J.: *Ann. N. Y. Acad. Sci.*, 59:8, 1954.

6. Moench, L. G.: Book on Office Psychiatry.

7. Aldrich, C. Knight: The Handling of Emotional Problems by the Family Physician. *N. Y. Jour. Med.*, 248:174-179, Jan. 29, 1953.

COURSE IN RHINOPLASTY, RECONSTRUCTIVE SURGERY OF NASAL SEPTUM AND OTOPLASTY.

An intensive postgraduate course in Rhinoplasty, Reconstructive Surgery of the Nasal Septum and Otoplasty will be given July 16, 1955, to July 30, 1955, by Dr. Irving B. Goldman and staff at The Mount Sinai Hospital, New York City, in affiliation with Columbia University.

Candidates should apply to Registrar for Postgraduate Medical Instruction, The Mount Sinai Hospital, 5th Avenue and 100th Street, New York 29, New York.

AN INQUIRY INTO CURRENT CONCEPTS OF VISUAL SPEECH RECEPTION (LIP-READING).*

JACQUELINE KEASTER, M.S.,

(by Invitation.)

Los Angeles, Calif.

Most of us from time to time see patients with handicapping hearing losses that are not ameliorated to any extent by the use of a hearing aid. In some instances it is because of the contour of the loss; in other cases, the extent of the impairment is so great that the most powerful aid can serve only to bring the wearer some slight awareness of environmental sounds; and in still other situations the presence of recruitment tends to make amplified sound uncomfortable even to the point of its being painful.

Under such circumstances, we tell the hard-of-hearing person, rather glibly sometimes, that he must learn lip-reading. Some patients follow our advice; they learn lip-reading even to the extent that the untutored may question whether the patient is really hard of hearing or only pretending to be. On the other hand, there are other patients with comparable losses who, try as they will, never really learn to read speech with any facility. Some of them have taken lip-reading instruction over a long period of time and have spent a great deal of time and practice with very little improvement in their lip-reading ability.

Observations of this nature are made frequently in clinical practice, and very often in schools for the deaf and hard of hearing, but little is known about why or what the factors are influencing this difference in skill. Historically, the teaching of lip-reading dates back to about the middle of the 17th century in Europe, when the old records state that the deaf man was taught "to listen with his eye."

* Read at the meeting of the Western Section, American Laryngological, Rhinological and Otological Society, Inc., Los Angeles, Calif., January 16, 1955.

Editor's Note: This ms. received in The Laryngoscope Office and accepted for publication January 31, 1955.

The first school which taught lip-reading to children in this country was opened in Northampton, Massachusetts, in 1867. Little is known about the lip-reading methods employed in that teaching.

It was not until about 1912 that mention is made in the history of the education of the deaf and hard-of-hearing, of adults being taught to lip-read as early as 1882, but it was not until the early 1900's that there was any specific teaching of lip-reading to the adult hard-of-hearing patient. Three so-called methods of teaching the skill came into being about that time. The methods were based on the then current notions concerning the teaching of reading: one was highly anlytical; it began with the syllable, proceeded to the word, from the word to the sentence and from the sentence to the story. Another started with the story and broke it into its parts; and the third method purported to be a combination of the other two.

Hard-of-hearing people took what were called "normal training courses" in a method of teaching and set themselves up as private teachers of lip-reading. There was a tendency on the part of these people to adhere with a tenacious grip to the tenets of the method advocated, and never to question why a patient succeeded or failed to learn.

No new method of teaching was introduced until 1927, when the Jena method was brought from Germany and introduced at the Northern Michigan College of Education in Ypsilanti. Since that time, there have been adaptations made of the various methods, but very little scientific inquiry concerning why some people learn to lip-read with comparatively little effort and despite or because of any method of teaching, while others never do learn to follow speech with any facility regardless of their background and education or their native intelligence.

Several years ago in order to begin to investigate something of why this takes place, we made up a set of 15 colloquial sentences. Moving pictures were then taken of a young woman speaking the sentences in a normal voice. The resultant film was then shown, without a sound track, to a group of 40 college students with normal hearing. Using such a group for the experiment it was possible to control a number of variables: intelligence, age, and most of all, training. No

one of the 40 had had any training in lip-reading or, for the most part, even knew what it was.

If credit was given for parts of sentences read correctly, a possible score of 96 points could be earned on the material. The scores at the conclusion ranged from 8 to 94 points, with a clustering of scores around 30 points. In order further to check our observation, we tried the sentences with two young women, then students in the university, who were hard-of-hearing. One, to all intents and purposes, was totally deaf and lost her hearing with meningitis when she was a senior in high school. The other was girl who had been severely hard-of-hearing from birth.

The first girl made a perfect score on the sentence; the second scored only 36 points. The latter had been virtually dependent upon lip-reading for purposes of communication all of her life and had lip-reading instruction since she was a little girl. The other student lost her hearing only two years before and had very little instruction compared to the other person yet she made a significantly higher score on the material. The difference between the two is not unlike that of the range of scores of the 40 students with normal hearing who had no lip-reading instruction.

At best such material as was shown only roughly simulates a live conversational situation. A film of this sort is more difficult because of its lack of situational cues, occasional sound, gesture and so forth, but it gives you some idea of what confronts the hard-of-hearing person when he attempts to understand speech by attentively watching the speaker.

When we stop to consider spoken language, we realize that it is made up of a rapid succession of over-lapping syllables that are in turn comprised of some 40-odd sounds of varying degrees of visibility. The lip-reader must be able to recognize instantly all of the visible movements and fill in those that are invisible. Only about 30 per cent of the sounds of English speech are in the former category; all the other sounds are hidden in the mouth, or look like one or two other cognate sounds.

For example, the sounds *p*, *b*, and *m* sound different one from the other, but they look exactly alike. Ideas must be grasped in a fleeting instant; speech is never static. It is a constantly moving change of syllables. No two mouths are alike and no two individual speech patterns are identical. All this we know, but what we do not know is what factors account for the wide range in the ability of people to lip-read.

The old books dismissed it in some such fashion as this: "Results in lip-reading, it goes without saying, vary greatly depending upon the student's type of mind and in general upon his character." Actually, that does not say very much beyond the fact that a patient learns to lip-read, or he doesn't.

In 1944 Utley reported a study done with 761 deaf and hard-of-hearing individuals enrolled in schools or societies for the acoustically handicapped in four large cities. The material used consisted of 100 words, 70 sentences and six short stories spoken by university students using what was considered to be average American speech. It was filmed in order that all the subjects saw exactly the same material.

The validity of the test was established by its logical derivation as a representative work sample from everyday life, and by the high reliability resulting from the inter-relationships of the test material. The results showed: Lip-reading ability cannot be predicted by reading level or school achievement; lip-reading ability cannot be predicted from chronological age, age of onset of deafness or grade placement. It was also found that it is not possible to arrange test items in the order of their difficulty. Our observations would point to the possibility that there is not a high correlation between lip-reading and general intelligence.

Up to this time most of the investigative work that has been done in the field of lip-reading has pointed toward the standardization of test batteries that would test lip-reading ability, but nothing has been done to specifically investigate factors which influence the acquisition of that skill. We have, therefore, prepared a set of materials consisting of six sets of 120 sentences each spoken by six different speakers, three men and three women.

We propose to start our test situation by showing the material to a group of approximately 50 normally hearing university students in order to eliminate those sentences that do not discriminate; *i.e.*, those that are too easy and those that a majority fail. This preliminary run should also show up any gross differences between speakers. In that way we hope to eliminate enough material to make this work sample useful in terms of length.

We then propose to try the material with another group of normally hearing students and at the same time administer a wide battery of psychological aptitude tests along with projective tests of personality. Comparable batteries should be set up at the same time with a group of hard-of-hearing adults who learned speech and language normally through their ears; *i.e.*, we want to keep the deaf and the hard-of-hearing groups separate.

In Group 1 it will be possible to control, at least to a degree, such factors as age and intelligence. Group 2 will be homogeneous only in terms of the existence of a handicapping loss. We expect such a project to take years to accomplish, but we feel that there is no other way to ferret out a possible answer to the problem. We may find that no pattern exists and that there are no specific traits closely correlated with lip-reading ability, but to find even that is worth a try.

In summary, it might be said that all of us who work with the hard-of-hearing have observed wide differences in lip-reading ability. There are indications that such ability is not closely correlated with general intelligence or the amount of lip-reading instruction.

A study has been outlined which will attempt to correlate such ability with specific psychological aptitudes and with projective tests of personality in order to arrive at some clues as to how to make lip-reading instruction more effective for those people who have difficulty learning the art.

BIBLIOGRAPHY.

1. UTLEY, JEAN: A Test of Lip-Reading Ability. *Jour. Sp. Dis.*, 11:109-116, 1946.

2. DAVIS, HALLOWELL: *Hearing and Deafness.* Murray Hill, pp. 257-274, 1947.

SOME RHINOLOGICAL SYNDROMES AND VASOMOTOR RHINITIS.*

JAMES CHESSEN, M.D.,

and

IVAN W. PHILPOTT, M.D.,

Denver, Colo.

Anatomical abnormalities of the nose are in themselves not necessarily causes of nasal disorders; however, when the anatomical malformation involves a part of the nose that is important to its physiological function, the disturbance created becomes a troublesome factor. Cottle[1] has suggested that there are several such anatomical disharmonies which, at least in some cases, do cause the nasal disorder commonly referred to as vasomotor rhinitis.

This discussion will concern itself with a brief description of several symptom complexes of nasal disorders which may well be called syndromes. It is fitting to call them "Cottle's Nasal Syndromes" as he was the first to describe and correlate the clinical picture with disturbed anatomy in these instances.

Oftentimes the etiology of vasomotor rhinitis rests in allergy, emotional disturbances, endocrine disorders, certain infectious conditions superimposed upon an allergic background, etc. For these cases we have little to add. It is in those cases where the etiology is often obscure that consideration of these syndromes is suggested as etiological factors in vasomotor rhinitis. This discussion will briefly concern five syndromes.[2]

1. Open Space Syndrome.
2. Open Roof Syndrome.
3. Upper Lateral Cartilage Syndromes.
   a. Ballooning.

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* Read at the meeting of the Western Section, American Laryngological, Rhinological and Otological Society, Inc., Los Angeles, Calif., January 16, 1955.

Editor's Note: This ms. received in The Laryngoscope Office and accepted for publication January 31, 1955.

b. Returning.

c. Insufficiency.

4. Tension Nose Syndrome.

5. High Clinical Nasal Index Syndrome.

The nose can be divided into two parts: the external and the internal.[3] The external portion, the part extending from the face, is commonly called the external nasal pyramid. It comprises the nasal bones, the upper lateral cartilages, the lower or lateral or lobular cartilages, the vestibular structures, and part of the nasal septum. This portion of the nose is, in reality, an attic or air cavity.[3]

If one were to slice the external nose off the face, it would be at the nasal facial junction on a line drawn from the internal canthus region to the alar facial fold. This would create the nasal aperture. Posterior to this dividing plane is the internal nose where the nose turbinates and most of the functioning part of the nasal mucous membrane are located. Physiologically, the mucous membrane can be divided into a lower respiratory portion and an upper olfactory portion.

Cottle has demonstrated very convincingly that the external nose is designed not only to protect but also to prepare the incoming air for the internal nose.

He says,[3] "The whole pyramid has several functions. It plays a role in modifying and controlling the shape, course, pressure, velocities, and whirls of the air currents; it also serves, I believe, as a tempering chamber to modify the temperature of the inspired air before it enters the nasal chambers; also, it acts as a buffer to the air currents on expiration, holding back not only the air stream but also the moisture and warmth brought up from the lower respiratory tract. To subserve these functions most efficiently, an insulated roof to the external nose is essential."

The syndromes described are chiefly concerned with the structures of the external nose. In the main, malformation and malfunction of these structures permit air that is not properly prepared or conditioned to reach the internal nose. This air then acts as an irritant to the nasal mucosa, which

may result in congestion of the mucosa, altered secretions, neurological disturbances, and vascular alterations.

Each of these syndromes has many individual characteristics, but all have at least one thing in common—vasomotor changes due to physical causes.

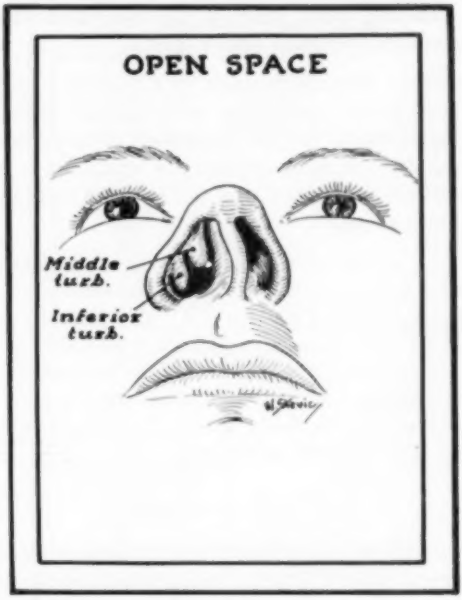

Fig. 1. I. CLINICAL SYMPTOMS: 1. Pain and headache; 2. P.N. drip; 3. Cough and (bronchitis); 4. Sore and dry throat.

II. DIFFERENTIAL DIAGNOSIS: 1. Cephalgia—Histamine, Sluder, Costen, Psychoneurosis. 2. Allergy; 3. Endocrine disorders; 4. Sinusitis; 5. Psychoneurosis; 6. Vasomotor rhinitis.

OPEN SPACE SYNDROME.[1]

The disturbances created in the nose by excessive space alone have not been sufficiently recognized in the past. On the contrary, surgical measures have been advocated which created more space in the nose. The term "adequate space,"

or "adequate airway," was applied to describe the characteristics of the internal portion of the nose, basically meaning that there was plenty of room in the nose.

Actually, excessive space in the nose is more of a hindrance than an aid to function. Too much space prevents adequate resistance to the air currents. It has been well established that nasal resistance is important in normal respiration. It is thought that too much space in the nose also causes symptoms of vasomotor rhinitis (see Fig. 1).

The symptoms frequently seen in Colorado and the Rocky Mountain region are: epistaxis, crusting, dry irritated nose, vague ear symptoms, "winter bronchitis," raw sore throats, etc. The number of patients having symptoms ascribed to the wide open side, the side referred to as having an adequate airway, is impressive.

Of course, if such formidable anatomical anomalies as impaction of the septum and tension are present, symptoms will also be referred to the narrow side, and thus to both sides. In this type of nose, excessive exposure and irritation of the anterior ends of the inferior and middle turbinates may produce a variety of symptoms which could well be confused with histamine cephalgia, Costen's syndrome, Sluder's syndrome, and infra or supraorbital neuralgia.

OPEN ROOF SYNDROME.[1]

The dorsum of the nose should act as a multilayered roof,[3] and every good roof provides insulation for the structures below. Many patients have inadequate dorsums due to a variety of causes; namely, congenital abnormalities, nasal injuries, and diseases which have destroyed the cartilages. The most common injuries, perhaps, are those produced by hump removal and fractures of the nasal bone (see Fig. 2).

In nasal fractures it is important to remember that the bones, being membranous, heal by scar formation and not by bony union. An inadequate roof may be the result.

These patients present a clinical picture often labeled as physical allergy. They cannot stand drafts, changes of

weather, excess humidity, etc. Many are too often diagnosed as psychoneurotics; therefore, in examination of the nose, particular attention should be directed toward the nasal dorsum.

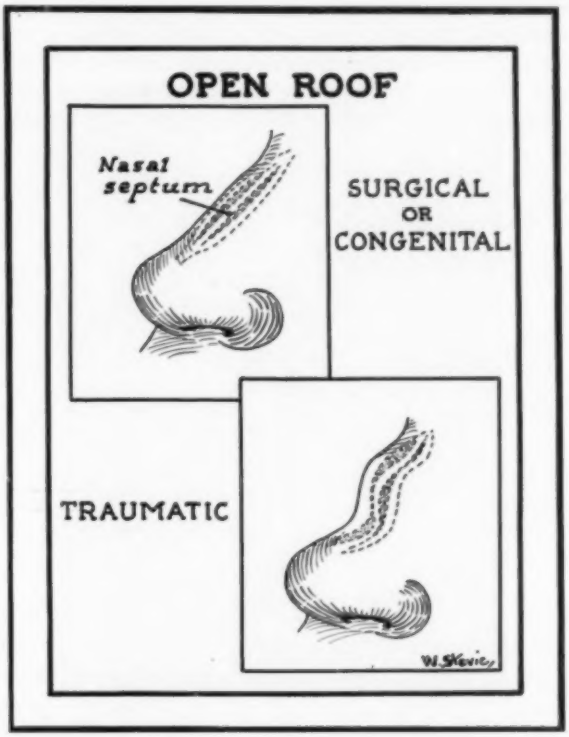

Fig. 2. I. CLINICAL SYMPTOMS: Can't stand changes of weather, temperature, humidity, wind, etc. Causes nasal irritation of all degrees.

II. DIFFERENTIAL DIAGNOSIS: 1. Physical allergy; 2. Psychosomatic disorders; 3. Vasomotor rhinitis.

Palpation of the nasal dorsum will determine whether or not the nasal bones are present, whether or not the nasal bones are conjoined with the nasal septum and upper lateral

cartilages, and whether or not the upper lateral cartilages are conjoined with the septum (see Fig. 3).

Roentgenograms will frequently help in revealing the presence or absence of nasal bones. In addition, a detailed history pertaining to injuries, surgery, and diseases which might have caused cartilage destruction or distortion will aid diagnosis.

Fig. 3. (Courtesy R. H. Riggs). Hypo needle through Open Roof reproducing patient's symptoms.

Therapy consists of providing protection or reconstruction of the dorsum. The nose should be covered for a trial period with flannel or similar covering, especially at night or when exposed to weather changes. This will serve as both a diagnostic and a therapeutic aid.

UPPER LATERAL CARTILAGE SYNDROME.[1]

This syndrome is perhaps the most important. The delicate mechanism of the integrated action of the upper lateral cartilage valve and lobular cartilage is very complex, and extremely important in the physiology of normal breathing. The anatomy of the upper lateral cartilage must be understood thoroughly. Actually, the upper lateral cartilages are wings of the septum. They are attached superiorly, to a variable extent, to the under surface of the nasal bones by loose connective tissue. At their caudal or terminal ends they join the septum by a fibrous union.

At this fibrous junction there is a definite valve formation[4] that allows the upper lateral cartilage to swing closer to the septum on inspiration, and away from the septum on expiration. This increases the pressure with which air is received and expelled through the nose.

Here, in a normal nose, there is only a slit-like passage through which the air must pass. The angle of the valve, its stiffness, its relative position, and its mobility are all very important.

Time does not permit a detailed discussion, but it is suggested that the study of this mechanism will comprise a great deal of the rhinological activity of the near future,[6] both medical and surgical.

The altered anatomy frequently found is:

Ballooning or Bowing Out.[2] Since this region of the nose is so frequently injured, numerous abnormalities may occur. Normally, the upper lateral cartilage presents a convex surface to the nasal septum. Injury may change the convexity of the presenting surface to a concavity, which results in what Cottle refers to as a ballooning or bowing out of the upper lateral cartilage (see Fig. 4).

This results in faulty valve action. It also creates too much space and, consequently, the air acts as an irritant on the mucous membrane of the anterior end of the inferior and middle turbinates and may produce vasomotor symptoms.

Returning[2] (see Fig. 5). The terminal portion of the upper lateral cartilage is often reflected and curled on itself, thus producing a double layer of cartilage. This results in a

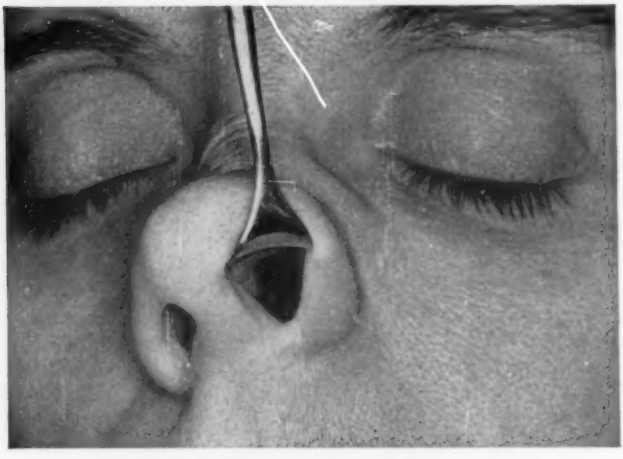

Fig. 4. (Courtesy Dr. R. Hadley). Ballooning upper lateral cartilage.

stiffness of the valve and inhibits the mobility of this portion of the valve. This condition is best observed by the use of an ear speculum or small forceps.[2]

Insufficiencies.[2] Valve insufficiencies may result from numerous causes. Among these are deformities of the upper lateral cartilages and the nasal septum, such as too much, too little, or even complete absence of cartilage. These may result from previous trauma, hematomata, abscess formation and scarring. Insufficiencies of the valve are far more frequent than previously suspected.

TENSION NOSE SYNDROME.[1]

Tension nose is a term which may describe conditions in which one or more anatomical parts of the nose have developed beyond their physiological limits. It has been suggested that tension nose occurs in many ways; however, the most

common is that of the high, long, frequently humped nose with a relatively straight septum so large that it seems to be trying to escape from the nose (see Fig. 6). Such noses may cause varied symptoms, with headache being the predominant

Fig. 5. (Courtesy Dr R. Hadley). Returning upper lateral cartilage.

complaint. Relief in these cases may be obtained by shortening and lowering the septum with preservation of the entire mucous membrane.

Another type of tension occurs with impactions[2] of the nasal septum in which circumscribed areas of mucous membrane are stretched to cover a shelfing or an obstruction. Impaction also causes the bone or cartilage of the septum to be pushed into the structures of the lateral wall of the nose, where it may produce many reflex nerve disturbances. Keeping in mind that ramifications of the Ist, Vth, VIIth, IXth and Xth Cranial Nerves are in the nasal mucosa, it is not difficult to understand that many abnormal neurological reflex disturbances may occur.

HIGH CLINICAL NASAL INDEX SYNDROME.[2]

Cottle, the first to call attention to the clinical sigificance of the nasal index, stressed the importance of determining

whether the nasal index is within the normal limits for the ethnic group to which the patient belongs (see Fig. 7). The measurements of the index are made on the patient's face (see Figs. 8, 9).

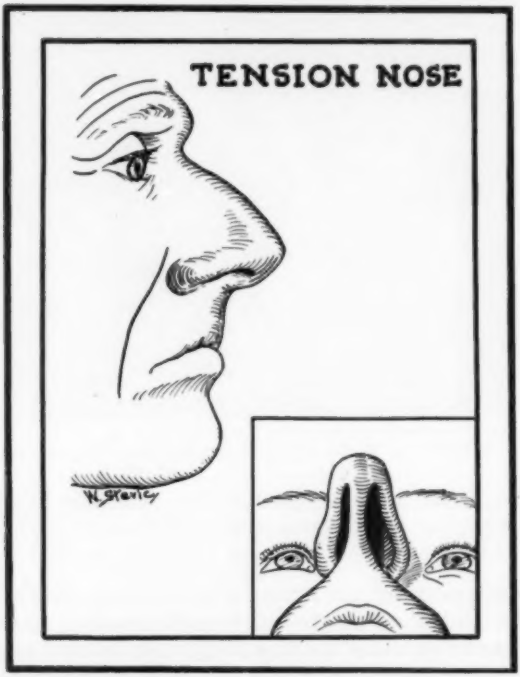

Fig. 6. I. CLINICAL SYMPTOMS: 1. Headache; 2. Head pain; 3. Nasal obstruction; 4. Excessive dryness or excessive drainage.

II. DIFFERENTIAL DIAGNOSIS: 1. Cephalgia of all types; 2. Vasomotor rhinitis; 3. Allergy; 4. Psychosomatic disorders.

The width measured is the distance between the lateral crests of the pyriform aperture felt through the skin. The height is the distance from the subnasale to the nasion, the latter being assumed to be at the level of the supra palpebral folds. The index is obtained by dividing the width by the

height and multiplying by 100. This is called the clinical nasal index.

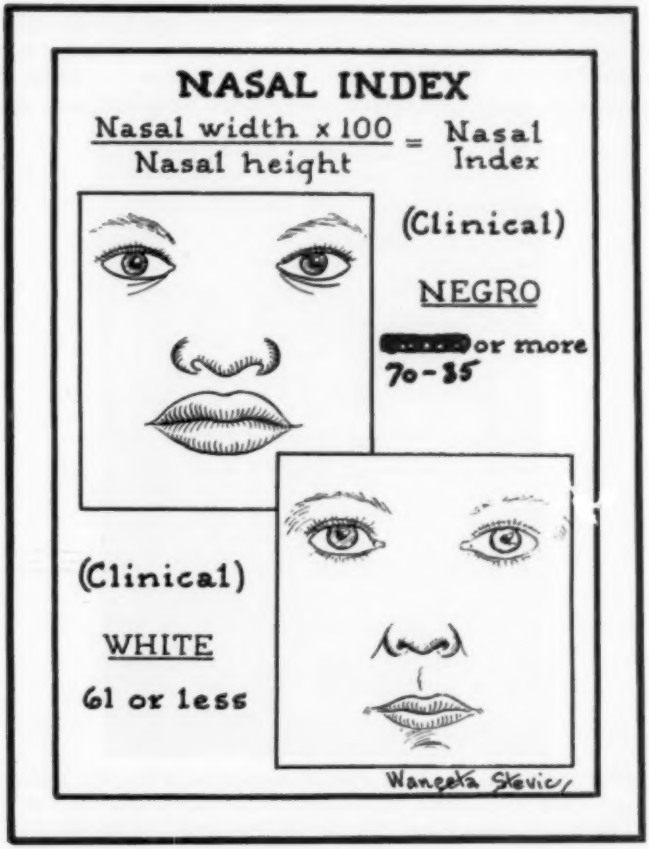

Fig. 7. If Nasal Index is wrong for person, he may be considered a "nasal cripple" in varying degrees.

The following figures are what Cottle has found to be the normal clinical nasal index for the various races of mankind:

Leptorrhine, which includes the Caucasian Race, 61 or less.

Mesorrhine, which includes the American Indians and the Orientals, 62 to 69.

Platyrrhine, which includes the Negro Race, 70 to 85.

When these indices do not prevail in their appropriate ethnic groups, severe nasal disharmonies are the rule. This is rather a drastic statement, but clinical observations in many patients this past year bear this out. Much work has been done

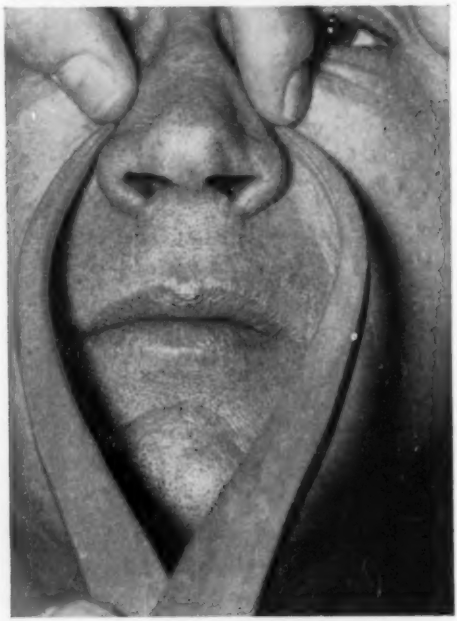

Fig. 8. Nasal Index, measuring width—lateral crests pyriform aperture.

by others in measuring and correlating nasal index with ethnic origin.

Williams,[5] in a paper soon to be published, has reviewed and carefully described all this work from an anthropological and clinical aspect and has added his own substantiations.

Most of these syndromes have many common factors: they often produce irritation of the mucous membrane which may

cause altered secretion and reflex nerve disturbances. Several are frequently found in the same patient. It is imperative not only to recognize these problems but also to have several simple therapeutic tests available.

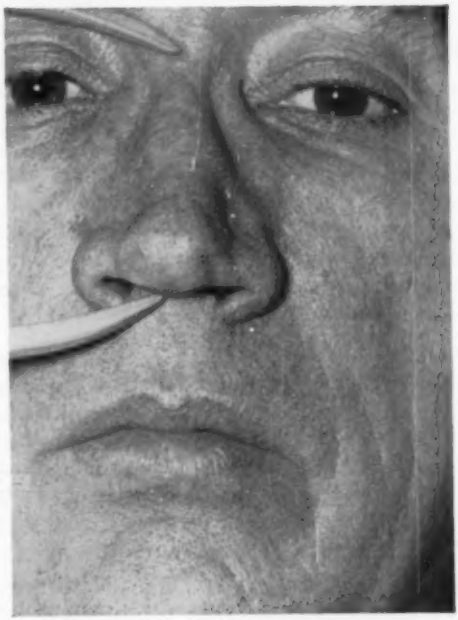

Fig. 9. Nasal Index, measuring height—subnasale to nasion.

Often these simple tests will help to evaluate a nose properly and perhaps to aid in determining whether or not surgical procedures are necessary to reconstruct the nose for proper physiological function. If a wide open space syndrome is suspected as the cause of the symptoms, the patient should wear cotton in each nostril day and night for 48 to 72 hours.

The cotton is placed in such a manner that it allows the patient to breathe through the nose. It is believed that the effect of the cotton is merely to slow, still and filter the air.[7]

Relief of headache and improvement of symptoms will frequently be dramatic.

If an open roof is suspected, especially with a history of old injury, previous rhinoplasty, or physical allergy, the patient should try wearing a cover over the nose,[2] particularly at night and during weather changes. This often proves beneficial to the patient, and indicates that surgical repair of the nasal dorsum may give relief.

One may learn a great deal from listening to his patients. When one of them says, and very frequently shows, that by tilting up his nose or by pulling on his cheek "to open up his nose," he can breathe better, he has pointed out his difficulty. What the patient has demonstrated is that the lobule and upper lateral cartilages of his nose are at fault, that the valve action of the upper lateral cartilage is impaired and must be reviewed, revised, and reconstructed. These patients should not be dismissed as neurotics.

To examine the upper lateral cartilages and the valve mechanism it is essential to clip the vibrissae and observe the movements of the terminal ends of the upper lateral cartilages with the patient's head in various positions,[1] and without the use of instruments in the nose (see Figs. 17-18). Only then can one diagnose, with any degree of accuracy, a ballooning, a returning, and other degrees of insufficiency of the valve mechanism.

The history of the patient's sleeping habits must be carefully evaluated.[2] If he cannot sleep on the right side, for example, one must check the upper lateral cartilage and vestibular elements on the opposite side with extreme care. Thus, the patient's history is again very important. The examination of the base of the nose and the vestibular structures without the use of instruments is indispensable.

Measurement of the clinical nasal index, a simple procedure taking but a few moments, will give valuable information. It is believed that the measurement and evaluation of the nasal index will not only be a routine procedure for the rhinologist in the future but will also become as important to him for diagnostic purposes, as the audiometer is to the otologist.

As aids in evaluating nasal health, the following are suggested:

Try placing cotton in the wide side or open space syndrome.

Try protecting the open roof with flannel or other covering.

Try correlating the nasal index measurements with nasal symptoms.

Try examining the vestibular structures without the use of instruments.

Try examining the valve action in various head positions.

Try correlating sleeping habits with disturbed valve action.

And finally, try thinking about the nose as an important organ of breathing, and not just in terms of inflammation, infection and allergy.

SUMMARY.

Vasomotor rhinitis has been discussed, and some important rhinological syndromes suggested as etiological factors. Simple diagnostic and therapeutic tests have been stressed as important routine procedures for the rhinologist in his every day practice. In a sense, it is thought that you have been introduced to the whole family of "Cottle's Nasal Syndromes," realizing that there has not been enough time to make you well acquainted with any one of the individual members. It is hoped that you will find time and opportunity to do so in the future.

REFERENCES.

1. Cottle, M. H.: Seminar Notes, Introduction to Fundamentals of Reconstructive Surgery of Nasal Septum and External Nasal Pyramid. *Ill. Masonic Hosp.*, 1947.

2. Cottle, M. H.: Introduction to Fundamentals of Reconstructive Surgery of Nasal Septum and External Nasal Pyramid. *Ill. Masonic Hosp.*, 1953.

3. Cottle, M. H.: Nasal Roof Repair and Hump Removal. *Jour. A.M.A. Arch. Otolaryngol.*, 60:408-414, Oct., 1954.

4. Mink, P. J.: Das Spiel der Nasenflügel. *Arch. f. d. ges. Physiol.*, Vol. 120:210-224, 1907.

5. Williams, R. I.: Personal Communication.

6. Cottle, M. H.: The Role of the Rhinologist in Rhinoplasty. The Laryngoscope, Vol. LXIII, 608-618, July, 1953.

SEVENTY-SIXTH ANNUAL MEETING OF THE AMERICAN LARYNGOLOGICAL ASSOCIATION

at Hollywood Beach Hotel, Hollywood, Fla.

March 13 - 14, 1955

PROGRAM

March 13, 1955

The Indications and Technique of Lymph Node Dissection of the Neck.....Alton Ochsner, M.D.

Evaluation of Neck Dissection in Carcinoma of the Larynx
Louis H. Clerf, M.D.

Mixed Tumors of the Posterior Pharyngeal Wall.....Fred Z. Havens, M.D., and L. C. Butler, Jr., M.D. (by invitation).

Vasomotor Rhinitis.....Theodore E. Walsh, M.D.

A Few Highlights Concerning Respiratory Cilia.....G. Edward Tremble, M.D.

The Radical Obliterative Frontal Sinus Operation. A Consideration of Technical Factors in Difficult Cases.....Robert L. Goodale, M.D.

Rehabilitation of Patients with Clefts of the Lip and Palate (Motion Picture Presentation).....Dean M. Lierle, M.D.

March 14, 1955

Unilateral Cord Paralysis.....Daniel S. Cunning, M.D.

Ten-Year Progress of Laryngofissure Operation.....Mercer G. Lynch, M.D.

General Tonsillectomy: Suggestions for Management and Peritonsillar Injection.....Paul M. Moore, M.D.

Carcinoma of Maxillary Sinus in Youth.....Bernard J. McMahon, M.D.

Functional Disturbances of the Upper Swallowing Mechanism
John R. Lindsay, M.D.

The Globus Syndrome as Related to Demonstrable Pathology of the Cervical Spine.....Lewis F. Morrison, M.D.

The Clinical Significance of a Motor Pattern in the Nucleus Ambiguous.....A. C. Furstenberg, M.D.

Blastomycosis of the Larynx.....William C. Thornell, M.D.

Laryngeal Papillomata: Surgical Technique for Removal of Recurring and Obstructive Growths.....DeGraaf Woodman, M.D.

FIFTY-NINTH ANNUAL MEETING OF THE AMERICAN LARYNGOLOGICAL, RHINOLOGICAL, AND OTOLOGICAL SOCIETY.

at Hollywood Fla.

PROGRAM

Tuesday, March 15, 1955

Time

A.M.

Scientific Session

9:50 1. *Lateral Vestigial Cysts and Fistulas of the Neck*
Bruce Proctor, M.D., Detroit, Mich., (Candidate's Thesis)

10:10 Open Discussion

10:20 2. *Stress and Disease*
Professor Hans Selye, Director of the University of Montreal Institute of Experimental Medicine and Surgery (By invitation)

11:20 Open Discussion

11:40 *15-Minute Recess*

11:55 3. *Otoscopic Cinematography of the Tympanic Membrane and Middle Ear*
Paul H. Holinger, M.D., Chicago, Ill.
(Co-authors: Kenneth C. Johnson, M.D.; Richard Buckingham, M.D.; Francis E. Lederer, M.D.; and Marvin Tamari, M.D.)

P.M.

12:25 4. *Epistaxis—Evaluation of Surgical Care*
Bernard L. Silverblatt, M.D., Pittsburgh, Pa. (Candidate's Thesis)

12:45 Open Discussion

Wednesday, March 16, 1955

A.M.

Scientific Session

9:30 5. *Surgical Treatment of Cancer of the Paranasal Sinuses*

Time

A.M.

Edgar L. Frazell, M.D., New York, N. Y. (By invitation)

10:00 *6. X-ray Therapy of Inoperable Cancer of Head and Neck*
Frank D. Lathrop, M.D., Boston, Mass.
Magnus I. Smedal, M.D., Boston, Mass. (By invitation)

10:30 Combined Discussion and Question Period

10:50 *7. Recent Observations on Living Human Cells with Cinematographic Technique*
C. M. Pomerat, M.D., Professor of Cytology, The University of Texas, Medical Branch (By invitation)
No Discussion

11:50 *15-Minute Recess*

P.M.

12:05 *8. Laryngectomy and Neck Dissections—Colored Movie*
Julius W. McCall, M.D., Cleveland, Ohio

12:25 *9. The Development of the Epithelium of the Larynx*
Eugene S. Hopp, M.D., San Francisco, Calif. (Candidate's Thesis)

12:45 Open Discussion

Thursday, March 17, 1955

A.M.

Scientific Session

9:30 *10. Presbycusis*
Harold F. Schuknecht, M.D., Detroit, Mich. (Candidate's Thesis)

9:50 Open Discussion

10:00 *11. Cancer of the External Auditory Meatus*
Daniel Miller, M.D., Boston, Mass.

10:20 Open Discussion

10:30 *12. Trans-Sphenoidal Approach to the Pituitary*
Albert C. Furstenberg, M.D., Ann Arbor, Mich.

Time

A.M.

11:00 Open Discussion

11:10 *15-Minute Recess*

11:25 *13. Unusual Endoscopic Lesions—Motion Picture*
Paul H. Holinger, M.D., Chicago, Ill.

11:45 *14. Restoration of Hearing in Otosclerosis by Mobilization of the Fixed Stapedial Footplate; an Analysis of Results*
Samuel Rosen, M.D., New York, N. Y.

P.M.

12:15 Open Discussion

PROGRAM OF EIGHTY-EIGHTH ANNUAL MEETING OF THE AMERICAN OTOLOGICAL SOCIETY, MARCH 17, 18, 19, 1955.

Hollywood Beach Hotel, Hollywood, Florida.

Thursday Afternoon, March 17, 1955.

Registration 1:30 P.M.

INTRODUCTION OF GUESTS

SCIENTIFIC MEETING 2:00 P.M.

1. *Address of President*.....D. E. Staunton Wishart, M.D.
2. *Introduction of the Guest of Honor*.....Harold Walker, M.D.
3. *The Fetal and Early Postnatal Development of the Tympanic Ring and Related Structures in Man*.....Barry J. Anson, Ph.D., Theodore Bast, Ph.D., and Shafik R. Richany, M.S. (by invitation).
4. *Bilateral Congenital Atresia of the External Auditory Meatuses*.....Franz Altmann, M.D.
5. *Auditory Fatigue and Adaptation in the Differential Diagnosis of End-Organ Deafness*.....J. D. Hood, Ph.D. (by invitation).
6. *An Additional Five-Year Review of Some Cases of Vertigo Reported in 1949*.....William J. McNally, M.D., and Edwin A. Stuart, M.D.

Friday Morning, March 18, 1955—9:00 A.M.

1. *Comparative Bone Conduction Excitation of Cochlear Microphonics in Tympanic and Labyrinthine Lesions*.....Victor Goodhill, M.D.
2. *Elastic Tissue of the Eustachian Tube*.....Stacy R. Guild, Ph.D.

SYMPOSIUM ON BLOOD CIRCULATION

1. *Vascular Phenomena of Living Tissues As Observed Microscopically*.....Eliot R. Clark, M.D. (by invitation).
2. *Small Blood Vessels During Allergic Reactions*.....John W. Irwin, M.D. (by invitation).
3. *Circulation of the Blood in the Living Cochlea. Microscopic Observations*.....Henry B. Perlman, M.D., and Robert S. Kimura (by invitation).
4. *The Effect of Anoxia on Cochlear Potentials*.....Cesar Fernandez, M.D. (by invitation).
5. *Observations on the Clinical Side of the Problem*.....Albert C. Furstenberg, M.D.
6. *Summary of the Symposium and Comments*.....Hallowell Davis, M.D.

Saturday Morning, March 19, 1955—9:00 A.M.

1. *Chemodectoma, Especially with Reference to Sensitivity to X-Ray*.....Henry L. Williams, M.D., D. S. Childs, Jr., M.D. (by invitation), Edith M. Parkhill, M.D. (by invitation), and D. G. Pugh, M.D. (by invitation).
2. *Problems Related to the Use of Speech in Clinical Audiometry*.....S. Richard Silverman, Ph.D., and Ira J. Hirsh, Ph.D. (by invitation).
3. *Late Results of Facial Nerve Repair*.....Robert C. Martin, M.D.
4. *A Review of Some Recent Studies Concerned with the External Ear*.....Ben H. Senturia, M.D., Lawrence H. Sophian, M.D. (by invitation), Oliver H. Lowry, M.D. (by invitation), and Sing-Pao Chiang, Ph.D. (by invitation).
5. *Induction of Incoming President.*

UNIVERSITY OF ILLINOIS ANNUAL ASSEMBLY IN OTOLARYNGOLOGY.

The Department of Otolaryngology, University of Illinois College of Medicine, announces its Annual Assembly of Otolaryngology from September 19 through October 1, 1955. This Assembly will consist of two parts:

Part I — September 19 through September 24, 1955, will be devoted to surgical anatomy of the head and neck, fundamental principles of neck surgery and histopathology of the ear, nose and throat. This week will be under the personal direction of Maurice F. Snitman, M.D.

Part II — September 26 through October 1, 1955, will be devoted entirely to lectures and panel discussion of advancements in otolaryngology. The chairman of this section will be Emaneul M. Skolnik, M.D.

Registration is optional for one or both weeks. For further information, address Dr. Francis L. Lederer, 1853 West Polk St., Chicago 13, Ill.

BRONCHOESOPHAGOLOGY COURSE.

The next Bronchoesophagology Course to be given by the Temple University School of Medicine is scheduled for June 13 to 24, 1955, under the direction of Dr. Chevalier L. Jackson.

Interested registrants will please write directly to the Department of Laryngology and Bronchoesophagology, Temple University School of Medicine, 3400 North Broad Street, Philadelphia 40, Pa.

POSTGRADUATE COURSE IN OTOLARYNGOLOGY.

The Department of Postgraduate Medicine of the University of Michigan Medical School announces the Otolaryngology Conference to be given at the University Hospital, Ann Arbor, Michigan, April 14, 15 and 16, 1955, under the direction of Dr. A. C. Furstenberg, Chairman of the Department of Otolaryngology at the University of Michigan Medical School.

Guest Lecturers: Dr. John M. Converse, New York City, N. Y.; Dr. Julius Lempert, New York City, N. Y.; Dr. Alden

H. Miller, Los Angeles, Calif.; Dr. Werner Mueller, Boston, Massachusetts; Dr. Henry L. Williams, Rochester, Minnesota.

Resident Lecturers: Dr. A. C. Furstenberg, Dr. James H. Maxwell, Dr. Walter J. Nungester, Dr. James L. Wilson, Dr. J. F. Holt, Dr. Isadore Lampe.

For further information, address: Dr. John M. Sheldon, Director, Department of Postgraduate Medicine, University Hospital, Ann Arbor, Michigan.

KENFIELD SCHOLARSHIP.

The American Hearing Society announces March 1 as opening date for competition for the 1955 Kenfield Memorial Scholarship, an award made annually to a prospective teacher of lipreading. Application blanks may be obtained by writing to the society's national headquarters, 817 14th St., N.W.. Washington 5, D. C.

Deadline for returning completed applications is May 1. They are to be mailed to Mrs. Dorothy J. Cornett, 4310 S.W. 14th St., Coral Gables 34, Fla.

Winner of the Kenfield Memorial award is entitled to take a teacher training course in lipreading from any school or university in the United States acceptable to the Teachers Committee. The scholarship is to be used within one year from the date of award.

MEETING OF THE GEORGIA SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY.

The Georgia Society of Ophthalmology and Otolaryngology will meet March 11 - 12, 1955, at the General Oglethorpe Hotel, Savannah, Georgia.

The speakers will be: Dr. Francis H. Adler, Philadelphia; J. W. McCall, Cleveland; Dr. J. A. Hilger, St. Paul; Dr. Walter H. Fink, Minneapolis; Dr. James H. Allen, New Orleans; and Dr. P. E. Ireland, Toronto, Canada. For further details, address Alton V. Hallum, M.D., Secretary, 245 Doctors Bldg., Atlanta 3, Ga.

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